SECTION 07311

ASPHALT SHINGLES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: Work of this Section consists of installing all materials furnished under this Section, including all equipment, labor, services, and incidental items required to complete work as shown on Drawings and specified in this Section.
   1. Asphalt shingle roofing over underlayment applied to roof sheathing (provided by Section 06100).
   2. Snowguards.
   3. Gutters and downspouts.
   4. Accessories.

B. Related Sections:
   1. 06100, Rough Carpentry; for roof sheathing and blocking and preparation.
   2. 07611, Copper Work; for copper flashing, trim, and other copper work.

1.03 SUBMITTALS

A. Product Data: Submit technical product data, installation instructions, and recommendations from shingle manufacturer, including data materials comply with requirements.

B. Samples:
   1. Submit full-range of samples for color and texture selection.
   2. After selection, submit 2 full-size shingles for verification of each color, style, texture selected.

1.04 QUALITY ASSURANCE

A. UL-Listing: Provide labeled materials tested and listed by UL for Class A and Rating indicated for each shingle type required.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's unopened, labeled containers.

B. Storage:
1. Store materials to avoid water damage; store rolled goods on end.
2. Comply with manufacturer's recommendations for jobsite storage and protection.

1.06 PROJECT/SITE CONDITIONS

A. Substrate: Proceed with shingle work only after substrate construction and penetrating work have been completed.

B. Weather Conditions: Proceed with shingle work only when weather conditions meet manufacturer's recommendations and when substrate is completely dry.

1.07 WARRANTY

A. Specified Product Warranty:
1. Provide shingle manufacturer's warranty on installed work, agreeing to pay for repair or replacement of defective shingles as necessary to eliminate leaks.
2. Warranty is 40 years from Substantial Completion.

PART 2 PRODUCTS

2.01 MATERIALS

A. Asphalt Shingle Materials:
1. Fire Rating: UL Class A External Fire Exposure Label.
2. Wind Rating: UL Wind-Resistant Label.
3. Type: Mineral-surfaced, self-sealing asphalt fiberglass strip shingles.
4. Color: As selected by Contracting Officer.

5. Product: Bird Div. (Certainteed Corp.) Model Woodscape 40, GAF Corp. Model Timberline Ultra, Celotex Corp. Model Dimensional 40 Shake, Owens Corning Corp. Model Oakridge Shadow.

B. Ice and Water Shield:
1. Type: Cold-applied, self-adhering preformed membrane.
2. Size: 36 in. wide.
3. Product: W.R. Grace Model Bituthene Ice and Water Shield, Certainteed Corp. Model Winter Guard, Owens-Corning Model Weatherguard.

C. Soffit Strip Vent - Linear Venting:
1. 2 in. wide prefinished 0.019 in. thick aluminum strip in 8 ft. lengths with insect screen.
2. Pattern: Linear vents.
3. Net Free Area: 9 sq. in. per lin. ft.
4. Finish: Baked enamel, color as selected by Contracting Officer.
5. Product: Air Vent Inc. Model Strip Vent, Leslie Locke Div. (Questor Co.) Model Undereave SofVent, Leigh Products Model Undereaves Ventilators.

D. Gutters and Downspouts:
1. Seamless Aluminum - Site Fabricated:
a. 0.032 ga. prefinished aluminum gutters with hidden bar hanger spaced 16 in. o.c. secured with galvanized fasteners.
b. Size: Refer to Drawings.
c. Color: As selected by Contracting Officer.

E. Snowguards:
1. Type: Formed or folded snow break with strap.
2. Product: Alpine Snow Guards Div. (Vermont Slate & Copper Services Inc.) Model #10 Pad-Style Snow Guards, M.J. Mullane Co. Model #100, Berger Bros. Inc. Model SGC100.

F. Accessories:
1. Asphalt-Saturated Roofing Felt: No. 15, unperforated organic felt, complying with ASTM D226, Type II, 36 in. wide, 18 lbs. per sq. approximate weight.
2. Asphalt Plastic Cement: Fibrated asphalt cement complying with ASTM D2822, designed for trowel application.
3. Hip and Ridge Shingles: Manufacturer's standard factory-precut units to match shingles.

4. Metal Accessories: Provide sheet metal clips, straps, anchoring of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.
5. Underlayment Fasteners: Hot-dip galvanized 11 or 12 ga. sharp-pointed conventional roofing nails with barbed shanks, min. 3/8 in. dia. head, and of sufficient length to penetrate min. 3/4 in. into solid decking or to penetrate through plywood sheathing.
6. Nails: Aluminum or hot-dip galvanized 11 or 12 ga. sharp-pointed conventional roofing nails with barbed shanks, min. 3/8 in. dia. head, and of sufficient length to penetrate min. 3/4 in. into solid decking or to penetrate through plywood sheathing.

2.02 FABRICATION

A. General - Flashing:
1. Shop-fabricate work to greatest extent possible.
2. Comply with details shown, and with applicable requirements of SMACNA Architectural Sheet Metal Manual and other recognized industry practices.
3. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of work.
4. Form work to fit substrates.
5. Comply with material manufacturer's instructions and recommendations for forming material.
6. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

B. Flashing Seams:
1. Fabricate nonmoving seams in sheet metal with flat-lock seams.
2. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.

C. Flashing Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used, or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, min. 1 in. deep, filled with mastic sealant concealed within joints.

D. Drip Edge: Brake-form to provide min. 3 in. roof deck flange and 1-1/2 in. fascia flange with 3/8 in. drip at lower edge.

PART 3 EXECUTION

3.01 PREPARATION

A. Cleaning:
1. Clean substrate of any projections and substances detrimental to shingling work.
2. Cover knotholes or other minor voids in substrate with sheet metal flashing secured with roofing nails.

B. Coordination:
1. Coordinate installation of shingles with flashing and other adjoining work to ensure proper sequencing.
2. Do not install shingle roofing until all vent stacks and other penetrations through roofing have been installed and are securely fastened against movement.

3.02 INSTALLATION

A. General: Comply with instructions and recommendations of shingle manufacturer, except to extent more stringent requirements are indicated.

B. Underlayment:
1. Eaves:
a. Lay initial 12 in. wide strip of ice and water shield continuously on roof deck starting at fascia.
b. Over initial strip of ice and water shield, apply drip edge and cover top 3 in. of drip edge with continuous 36 in. wide row of ice and water shield.
2. Closed Valleys: Apply min. 24 in. wide continuous strip of ice and water shield centered in valley and cover with 36 in. wide strip of No. 15 roofing felt.
3. Perimeter Underlayment: Apply strip of ice and water shield at ridges, hips, skylights, dormers, and gable edges to extend min. 24 in. inside of exterior wall line.

4. Field Area of Roof Deck:
   a. Apply roofing felt to roof deck using nails, with roofing felt overlapping final row of ice and water shield min. 2 in.
   b. Fasten roofing felt with min. 1 nail to each 1-1/3 sq. ft. of roof sheathing.

C. Shingles:
1. General:
   a. Install starter strip of roll roofing or inverted shingles with tabs removed.
   b. Fasten shingles in manufacturer's recommended pattern, weather exposure and number of fasteners per shingle.
2. Starter Strip:
   a. Cut tabs from full-width strip of shingle.
   b. Lay starter strip at eaves with adhesive strip positioned at edge of roof.
3. Shingle Placement:
   a. Start laying full-width strip shingles over starter strip and maintain exposure during laying.
   b. Use horizontal and vertical chalk lines to ensure straight coursing.
   c. Comply with installation details of shingle manufacturer and NRCA Steep Roofing Manual.
4. Flashing and Edge Protection: Install metal flashing, vent flashing and edge protection as shown and according to details and NRCA Steep Roofing Manual recommendations.

D. Ridge Vent:
1. Maintain 2 in. wide slot along ridge of roof.
2. Place strip of underlayment felt over course of shingles preceding last course of shingles before ridge vent slot, extend underlayment felt over top edge of last course of shingles and fold back underlayment felt to cover last course.
3. Place ridge over last course of shingles and nail in place.
4. At gable ends or terminations, apply end caps or other closure per manufacturer's instructions.
5. Remove exposed, excess underlayment felt extending beyond edge of vent, taking care to prevent damage to shingles; lay continuous bead of black silicone sealant between top of underlayment felt and bottom of vent, 1/4 in. in from edge of vent.

6. Shingling Ridge Cap:
   a. Apply shingles with 2-1/2 in. long shake nails.
   b. Make certain nails penetrate deck min. 1/2 in.
   c. Overlap ridge cap min. 2 in. and alternate ridge joint between shingles in succeeding cap.
7. Soffit Vent:
   a. Coordinate placement with soffit construction.
   b. Comply with manufacturer's instructions.

E. Gutters and Downspouts - Metal:
1. Use slip-joint connectors to connect gutter sections, end joints, or miter corners together.
2. Aluminum:
   a. Fill joints with sealant and connect together.
   b. Apply bead of sealant inside gutter along edge of connector.
   c. Drill holes for pop rivets in end cap and gutter section and bed end cap in sealant before pop riveting.
   d. Connect downspout and elbows to gutter using pop rivets.
3. Attach gutter sections to building using spike and ferrule every other rafter, on each side of any miter course, and two on each end section.
4. Make all connections in direction of water flow.
5. Fasten downspout to wall with hangers, min. 2 per length of downspout.
6. Install drip edge under shingles to prevent water reaching roof.
7. Wash system with detergent and touch-up scratches and chips.
8. Snowguards:
   a. Begin first row 15 in. from eave spaced 40 in. o.c.
   b. Stagger succeeding rows 20 in. and spaced 15 in. above preceding rows.
   c. Apply 3 rows of snowguards to cover area shown on Drawings.

END OF SECTION

SECTION 07530

SINGLE-PLY MEMBRANE ROOFING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: Work of this Section consists of installing all materials furnished under this Section, including all equipment, labor, services, and incidental items required to complete work as shown on Drawings and specified in this Section.
   1. Totally-adhered thermoplastic polyolefin (TPO) systems.
   2. Roof insulation related to flexible sheet roofing is specified in this Section, consisting of tapered and flat insulation with tapered insulation adhered to mechanically-fastened flat insulation applied over air/vapor rubberized asphalt sheet barrier adhered to substrate.
   3. Auxiliary materials.

B. Related Sections:
   1. 15400, Plumbing; for roof drains.

1.03 SUBMITTALS

A. Shop Drawings:
   1. Submit complete shop drawings showing roof configuration, sheet layout, seam locations, color (as applicable), details at perimeter, and special conditions.
   2. Indicate layout of tapered insulation materials.

1.04 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer:
      a. Obtain primary single-ply roofing from single manufacturer.
      b. Provide secondary materials as recommended by manufacturer of primary materials.

2. Installer:
   a. Engage experienced installer that has specialized in installing roofing systems similar to those required for Project.
   b. Installer must be acceptable to or licensed by manufacturer of primary roofing material.
   c. Work associated with single-ply membrane roofing including, but not limited to, insulation, flashing, and membrane sheet joint sealers, is to be performed by installer of this work.

B. Special Requirements:
   1. UL Listing: Provide labeled materials that have been tested and listed by UL in Building Materials Directory or by other nationally-recognized testing laboratory for application indicated, with Class A rated materials/system for roof slopes shown.

1.05 PROJECT/SITE CONDITIONS

A. Weather: Proceed with roofing work when existing and forecasted weather conditions permit work to be performed in accordance with manufacturer's recommendations and warranty requirements.

B. Substrate Conditions: Do not begin roofing installation until substrates have been inspected and are determined to be in satisfactory condition.

1.06 WARRANTY

A. Special Project Warranty: Submit two executed copies of Roofing Warranty, covering work of this Section, including roofing membrane, composition flashing, roof insulation, and roof accessories, signed and countersigned by installer (roofer) and Contractor.

B. Manufacturer's Warranty:
   1. Submit executed copy of single-ply membrane manufacturer's Limited Service Warranty Agreement, including flashing endorsement, signed by manufacturer's authorized representative.
   2. Provide form that was published with product literature as of date of Contract Documents.

C. Warranty Period: 10 years for membrane system warranty and 20 years for membrane material warranty after Substantial Completion.

D. This warranty shall not deprive Government of other rights Government may have under other provisions of Contract Documents and will be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

PART 2 PRODUCTS

2.01 MATERIALS

A. General:
1. Performance: Provide roofing materials recognized to be of generic type indicated and tested to show compliance with indicated performances.
2. Compatibility:
a. Provide products recommended by manufacturers to be fully compatible with indicated substrates.
b. Provide separation materials as required to eliminate contact between incompatible materials.

B. TPO Single-Ply Membrane:
1. Heat-weldable white TPO membrane, reinforced, I-90 wind resistant.
2. Thickness: 45 mils.
3. Product: Stevens Roofing System Model Stevens EP Fully Adhered, Firestone Building Products Co. Model Ultraply TPO, GAF Materials Corp. Model Everguard TPO, GenFlex Roofing Systems Model GenFlex TPO Fully Adhered.

C. Auxiliary Materials for Single-Ply:
1. Sheet Seaming System: Manufacturer's standard materials for sealing lapped joints, including edge sealer to cover exposed spliced edges as recommended by manufacturer of single-ply system.
2. Cant Strips and Flashing Accessories: Types recommended by manufacturer of single-ply material, including adhesive tapes, flashing cements, and sealants.
3. Flexible Material: Manufacturer's standard system compatible with single-ply membrane.
4. Slip Sheet: Type recommended by manufacturer of single-ply material for protection of sheet from incompatible substrates.

5. Membrane Adhesive: As recommended by single-ply membrane manufacturer for particular substrate and Project conditions, formulated to withstand min. 60 psf uplift force.

D. Insulation:
1. General:
a. Provide insulating materials to comply with requirements indicated for materials and compliance with referenced standards in sizes to fit applications indicated, selected from manufacturer's standard thicknesses, widths, and lengths.
b. Provide tapered boards where indicated for sloping to drain; fabricate with taper of 1/4 in. per ft., unless otherwise indicated.
2. Polyisocyanurate Board Roof Insulation: Rigid, cellular thermal insulation with polyisocyanurate closed-cell foam core and manufacturer's standard facing laminated to both sides; complying with FS HH-I-1972/2, Class 1.

E. Miscellaneous Insulation Materials:
1. Adhesive for Bonding Insulation: Type recommended by insulation manufacturer and complying with fire-resistance requirements.
2. Mastic Sealer: Type recommended by insulation manufacturer for bonding edge joints and filling voids.
3. Mechanical Anchors: As recommended by insulation manufacturer for deck type, and complying with fire and insurance rating requirements.

PART 3 EXECUTION

3.01 INSTALLATION

A. Insulation Installation:
1. General:
a. Extend insulation full thickness in two layers, or in multiple layers, over entire surface to be insulated, cutting and fitting tightly around obstructions.
b. Form cant strips, crickets, saddles, and tapered areas with additional material as shown and as required for proper drainage of membrane.

2. Joints:
   a. Stagger joints in one direction for each course.
   b. For multiple layers, stagger joints in both directions between courses with no gaps, to form complete thermal envelope.
3. Do not install more insulation each day than can be covered with membrane before end of day and before start of inclement weather.
4. Set tapered units in adhesive applied in accordance with requirements of applicable fire and insurance ratings.
5. Mechanical Fastening: Secure roof insulation to substrate with mechanical anchors of type and spacing indicated; do not provide less than 1 anchor per 4 sq. ft. of surface area or less anchorage than required by FM Loss Prevention Data Sheet 1-28.

B. Single-Ply Membrane:
1. General: Start installation only in presence of manufacturer's technical representative.
2. Cut out and repair membrane defects at end of each day's work.
3. Fully-Adhered Single-Ply:
   a. Install membrane by unrolling over prepared substrate, lapping adjoining sheets as recommended by manufacturer.
   b. Apply adhesive to surfaces to be bonded and roll single-ply into place when adhesive has properly cured.
   c. Treat seams with special cement and apply sealant to exposed sheet edges, tapering application as recommended by manufacturer.
   d. Install mechanical fasteners, flashings and counterflashings, and accessories at locations and as recommended by manufacturer.

3.02 PROTECTION OF ROOFING

A. On completion of roofing, including associated work, institute appropriate procedures for surveillance and protection of roofing during remainder of construction period.

B. At end of construction period, or when remaining construction will not affect or endanger roofing, make

final roofing inspection and prepare written report to Government, describing nature and extent of deterioration or damage found.

C. Repair or replace, as required, deteriorated or defective work found at Final Inspection to condition free of damage and deterioration at Substantial Completion and in accordance with requirements of specified warranty.

END OF SECTION

SECTION 07611

COPPER WORK

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: Work of this Section consists of installing all materials furnished under this Section, including all equipment, labor, services, and incidental items required to complete work as shown on Drawings and specified in this Section.
   1. Flashing.
   2. Miscellaneous accessories.

B. Related Sections:
   1. 07311, Asphalt Shingles; for coordinating copper work with shingle installation.

1.03 PROJECT CONDITIONS

A. Weather: Proceed with roofing work when existing and forecasted weather conditions permit work to be performed in accordance with manufacturer's recommendations and warranty requirements.

B. Substrate Conditions:
   1. Do not begin roofing installation until substrates have been inspected and are determined to be in satisfactory condition.
   2. Confirm direction and degree of slope of existing substrate before beginning installation to ensure positive drainage to conform to requirements of Drawings.

1.04 WARRANTY

A. Submit two executed copy of warranty covering installation and materials of this Section for 5 years

from Substantial Completion to repair or replace all defects in copper pans, flashing, and accessories that may develop during warranty period, signed and countersigned by installer (roofer) and Contractor.

B. Defects shall include, but not be limited to:
1. Failure to meet performance requirements.
2. Loose parts.
3. Leaking.
4. Wrinkling.
5. Buckling.
6. Nonuniformity of color or finish.
7. Galvanic action between roofing and dissimilar materials.

C. This warranty shall not deprive Government of other rights Government may have under other provisions of Contract Documents and will be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

PART 2 PRODUCTS

2.01 MATERIALS

A. Copper:
1. General: 99.9 percent nominal composition, 36,000 psi tensile strength for cold-rolled temper sheet, and 40,000 psi tensile strength for cold-rolled high-yield sheet.
2. Plain Sheet and Strip: ASTM B370, C11000 Alloy, cold-rolled temper, of size to suit seam locations and arrangements shown.
3. Copper Weight - Roof Flashings:
a. Base, Narrow: 16 oz.
b. Valley: 16 oz.

B. Miscellaneous Accessories:
1. Solder:
a. Plain Copper: ASTM B32, 50/50 tin/lead solder with rosin flux.
b. Flux: Muriatic acid killed with zinc or commercial brand of soldering flux.
2. Fasteners and Anchors:
a. Screws: Copper, bronze, or brass suited to substrate.
b. Nails: Flathead, barbed, wire slating nails, min. 12 ga. hard copper or brass, min. 1 in.

with finished length sufficient to penetrate sheathing min. 7/8 in.

c. Cleats: Min. 2 in. wide x 3 in. long, 16 oz. cold-rolled copper; space max. 12 in. o.c., lock one end into seams or folded edge of copper pans, nail other end with two nails, and fold remainder back over nail heads.

3. Elastomeric Sealant: Refer to Section 07901.

2.02 FABRICATION

A. General:
1. Shop-fabricate work to greatest extent possible.
2. Comply with details shown, and with applicable requirements of SMACNA Architectural Sheet Metal Manual, Copper Development Association, and other recognized industry practices.
3. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running copper work, sufficient to permanently prevent leakage, damage or deterioration of copper work.
4. Form copper work to fit substrates.
5. Comply with material manufacturer instructions and recommendations for forming material.
6. Form exposed copper work without excessive oil-canning, buckling and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
7. Seams:
   a. Fabricate nonmoving seams in sheet metal with flat-lock-seams.
   b. Tin edges to be seamed on both sides, form seams, and solder.
8. Expansion Provisions: Where lapped or bayonet-type expansion provisions in copper work cannot be used, or would not be sufficiently water and weatherproof, form expansion joints of intermeshing hooked flanges, min. 1 in. deep, filled with mastic sealant concealed within joints.

B. Sealant Joints: Where movable, nonexpansion-type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.

C. Separations: Provide for separation of metal from incompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

D. Copper Forming:
   1. Tinning:
      a. Tin edges of all sheets of uncoated copper to be soldered, applying solder on both sides for min. 1-1/2 in. width from edge.
      b. Do not tin lead-coated copper.
      c. Wire brush lead coating in contact with solder to produce bright finish before applying solder to seal seams and joints.
   2. Cross-Folded Loose-Seams:
      a. Use for slip joints of base flashings, expansion joints, and other similar unsoldered loose joints.
      b. Fold copper in one direction and then fold at right angle to first fold.
      c. Slit folded portion of copper sheet at crossfold and solder copper strip over slit to avoid binding at crossfold.

PART 3 EXECUTION

3.01 INSTALLATION

A. General:
   1. Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations, Copper Development Association, and with SMACNA Architectural Sheet Metal Manual.
   2. Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated.
   3. Install work with laps, joints and seams that will be permanently watertight and weatherproof.
   4. Soldering:
      a. Perform all soldering slowly, using well-heated coppers to heat seam thoroughly and sweat solder completely through seams, with seam showing min. 1 in. of evenly-flowed solder.
      b. Solder seams second time on slopes steeper than 45 deg.
      c. Where possible, perform soldering in flat position.

B. Edge and Drip Strips:
   1. Provide where sheet metal extends over edges and where necessary to secure sheet metal work at eaves, gables, rakes, and elsewhere.
   2. Form edges strips of 1-1/4 in. x 1/8 in. brass strip or 20 oz. copper sheet.
   3. Secure to building construction with brass screws max. 12 in. o.c.
   4. Use lead sleeves to receive screw where fastening is made in masonry or concrete.
   5. Install strips in continuous, butted long lengths to allow metal work to be hooked over lower edge, min. 3/4 in.
   6. At Contractor's option, double-folded 16 oz. copper may be used.

C. Flashing - General:
   1. Comply with FM Loss Prevention Data Sheet I-49 and SMACNA Sheet Metal Manual.
   2. Complete all metal work in conjunction with roofing and flashings to produce watertight installation.
   3. Provide adequate resistance to bending and allow for normal thermal expansion and contraction.
   4. Provide min. 4 in. nailing flange and fasten to solid wood blocking with fasteners of same type as metal being fastened with two rows of galvanized annular ring nails, 4 in. o.c. staggered, with min. 1-1/4 in. penetration into wood nailer.
   5. Install to provide watertight protection as detailed.
   6. Extend min. 4 in. around corners.
   7. Solder watertight three-way angles at corners.
   8. Make continuous straight runs in min. 10 ft. to max. 24 ft. lengths.

D. Base Flashing:
   1. Make base flashings using min. 8 ft. long sheets, formed into units max. 24 ft. long.
   2. Join with 3/4 in. locked soldered-seams.
   3. Join units together with 3 in. loose-locked-seam filled with sealant.
   4. Use similar loose-locked-seam at center of run for straight runs of less than 24 ft.
   5. Place loose-locked-seam max. 5 ft. from any corner.

E. Valley Flashing - Open Valleys:
   1. Use copper sheets in max. 10 ft. lengths.
   2. Use 16 oz. for wood and asphalt shingle roofing.
   3. Use 24 oz. copper for slate or tile roofing.

4. Extend valley flashing min. 5 in. under roof covering with side edges folded 1/2 in. for cleating.
5. Lap sheets 6 in. in direction of water flow.
6. Nail upper end of each sheet to substrate.
7. Secure side edges with copper cleats 24 in. o.c.
8. Make open portion at top of valley min. 5 in. wide and increase in width 1/8 in. per foot toward eaves.
9. Where roofs intersect at different slopes, form inverted V, 1 in. high in metal along centerline of valley, and increase lap of valley sheets to 8 in.

3.02 ADJUSTING AND PROTECTION

A. Protection:
1. On completion of roofing, including associated work, institute appropriate procedures for surveillance and protection of roofing during remainder of construction period.
2. At end of construction period, or when remaining construction will not affect or endanger roofing, make final roofing inspection and prepare written report to Government, describing nature and extent of deterioration or damage found.
3. Protection: Installer shall advise Contractor of required procedures for surveillance and protection of flashings and sheet metal work during construction, to ensure work will be without damage or deterioration, other than natural weathering, at Substantial Completion.
4. Repair or replace, as required, deteriorated or defective work found at Final Inspection to condition free of damage and deterioration at Substantial Completion and in accordance with requirements of specified warranty.

END OF SECTION

SECTION 07841

THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: Work of this Section consists of installing all materials furnished under this Section, including all equipment, labor, services, and incidental items required to complete work as shown on Drawings and specified in this Section.
   1. Penetrations through fire-resistance-rated floors and roof construction, including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
   2. Penetrations through fire-resistance-rated walls and partitions, including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
   3. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.

B. Related Sections:
   1. 03300, Cast-In-Place Concrete; for construction of openings in concrete slabs and walls to accommodate penetrating items.
   2. 04200, Unit Masonry; for construction of openings in walls to accommodate penetrating items.
   3. 09255, Gypsum Board Assemblies; for construction of openings in walls to accommodate penetrating items.

1.03 SYSTEM PERFORMANCE

A. General: Provide systems produced and installed to resist spread of fire and passage of smoke and other gases and according to Code requirements.

B. F-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F-ratings

indicated, as determined per ASTM E814, but not less than that equaling or exceeding fire-resistance rating of construction penetration.

C. T-Rated Through-Penetration Firestop Systems:
1. Provide through-penetration firestop systems with T-ratings in addition to F-ratings, as determined per ASTM E814, where systems protect penetrating items exposed to contact with adjacent materials in occupiable floor areas.
2. T-rated assemblies are required where following conditions exist:
a. Where systems protect penetrations located outside of wall cavities.
b. Where systems protect penetrations located outside fire-resistive shaft enclosures.
c. Where systems protect penetrations located in construction containing doors required to have temperature-rise rating.
d. Where systems protect penetrating items larger than 4 in. dia. nominal pipe or 16 sq. in. in overall cross-sectional area.

1.04 SUBMITTALS

A. Product Data:
1. Submit manufacturer's technical data for each product required, including product characteristics, typical uses, performance and limitation criteria, test data, instruction for preparation, and firestop application.
2. Certification by firestop manufacturer products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.

1.05 QUALITY ASSURANCE

A. Qualifications:
1. Installer:
a. Engage experienced installer who is certified, licensed, or qualified by firestop manufacturer as having necessary experience, staff, and training to install manufacturer's products per specified requirements.
b. Manufacturer's willingness to sell its firestop products to Contractor or to installer engaged by Contractor does not confer qualification on buyer.

B. Single Source Responsibility: Obtain through-penetration firestop systems for each kind of penetration and construction condition indicated from single manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver firestop products to Project site in original unopened containers or packages with intact and legible manufacturer's labels identifying product and manufacturer; date of manufacturer; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.

B. Store and handle firestop materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.07 PROJECT/SITE CONDITIONS

A. Environmental Conditions: Do not install firestop when ambient or substrate temperatures are outside limits permitted by firestop manufacturer or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilation: Ventilate firestop per firestop manufacturer's instructions by natural means or, where this is inadequate, forced air circulation.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Through-Penetration Firestop Systems: A/D Fire Protection Systems Inc., Hilti Construction Chemicals Inc., Isolatek International Corp., Nelson Firestop products, RectorSeal Corp., 3M Fire Protection Products.

2.02 MATERIALS

A. Compatibility: Provide firestop composed of components compatible with each other, substrates forming openings, and items, if any, penetrating firestop under conditions of service and application, as demonstrated by firestop manufacturer based on testing and field experience.

B. Accessories:
   1. Provide components for each firestop system needed to install fill materials and to comply with System Performance Requirements article in Part 1 of this Section.
   2. Use only components specified by firestop manufacturer and approved by qualified testing and inspecting agency for designated fire-resistance-rated systems.
   3. Accessories include, but are not limited to, following items.
      a. Permanent forming/damming/backing materials include; semirefractory fiber (mineral wool) insulation, ceramic fiber, or fire-rated formboard.
      b. Temporary forming materials.
      c. Substrate primers.
      d. Collars.
      e. Steel sleeves.

C. Firestop Systems with no Penetrating Items (e.g., top of partition to underside of deck and similar conditions):
   1. UL Classified System C-AJ-0001-0999, using either intumescent putty or silicone sealant.
   2. At nonrated locations, refer to Section 04200 for compressible or premolded fillers.

D. Firestop Systems for Metallic Pipes, Conduit, or Tubing: UL Classified System C-AJ-1001-1999, using either intumescent putty or silicone sealant.

E. Firestop Systems for Nonmetallic Pipes, Conduit, or Tubing: UL Classified System C-AJ-2001-2999, using intumescent wrap strips and intumescent putty.

F. Firestop Systems for Electrical and Data (Telephone) Cables: UL Classified System C-AJ-3001-3999, using pillows/bags.

G. Firestop Systems for Cable Trays: UL Classified System C-AJ-4001-4999, using pillows/bags.

H. Firestop Systems for Insulated Pipes: UL Classified System C-AJ-5001-5999, using intumescent wrap strips and putty.

I. Firestop Systems for Miscellaneous Electrical Penetrants: UL Classified System C-AJ-6001-6999, using intumescent putty or mortar.

J. Firestop Systems for Miscellaneous Mechanical Penetrants: UL Classified System C-AJ-7001-7999, using mortar.

2.03 MIXING

A. For those products requiring mixing before application, comply with firestop manufacturer's directions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce firestop products of uniform quality with optimum performance characteristics for application indicated.

PART 3 EXECUTION

3.01 PREPARATION

A. Surface Cleaning:
1. Clean out openings and joints immediately before installing firestop to comply with recommendations of firestop manufacturer and following requirements.
2. Remove all foreign materials from surface of opening and joint substrates and from penetrating items that could interfere with adhesion of firestop.
3. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestop.
4. Remove loose particles remaining from cleaning operation.
5. Remove laitance and form-release agents from concrete.

B. Priming:
1. Prime surface where recommended by firestop manufacturer using that manufacturer's recommended products and methods.
2. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape:
1. Use masking tape to prevent firestop from contacting adjoining surfaces that will remain exposed on completion of work and that would be

permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop materials.

2. Remove tape as soon as it is possible to do so without disturbing firestop's seal with substrates.

3.02 INSTALLATION

A. Through-Penetration Firestop:
   1. Comply with System Performance Requirements Article in Part 1 of this Section and through-penetration firestop manufacturer's instructions and drawings pertaining to products and applications indicated.
   2. Install forming/damming materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems.
   3. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
   4. Install fill materials for through-penetration firestop systems by proven techniques to produce following results:
      a. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
      b. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
      c. For fill materials that will remain exposed after completing work, finish to produce smooth, uniform surfaces flush with adjoining finishes.

B. Identification:
   1. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels.
   2. Attach labels permanently to both sides of each firestop system with labels positioned to be visible to anyone seeking to remove penetrating items or firestop systems.
   3. Include following information on labels:
      a. Wording: "WARNING - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of any Damage."

b. Contractor's name, address, and telephone number.
c. Through-penetration UL Design Designation.
d. Date of installation.
e. Manufacturer's name.
f. Installer's name.

3.03 CLEANING AND PROTECTION

A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestop products and of products in which openings and joints occur.

B. Protection:
1. Protect firestop during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so they are without deterioration or damage at Substantial Completion.
2. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestop immediately and install new materials to produce firestop system complying with specified requirements.

END OF SECTION

SECTION 07901

JOINT SEALANTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: Work of this Section consists of installing all materials furnished under this Section, including all equipment, labor, services, and incidental items required to complete work as shown on Drawings and specified in this Section.
   1. One-part, nonsag polyurethane joint sealers for exterior joints in vertical surfaces and nontraffic horizontal surfaces.
   2. One-part, pourable polyurethane joints sealers for exterior and interior joints in horizontal traffic surfaces.
   3. Paintable acrylic emulsion joint sealers for interior joints in vertical surfaces and horizontal nontraffic surfaces, except as otherwise noted.
   4. One-part, mildew-resistant silicone sealant for use in sealing interior joints between:
      a. Perimeter of plumbing fixtures and adjacent construction.
      b. Metal door frames and adjacent construction in toilet rooms, mechanical rooms, and electrical rooms.
      c. Countertops and separate backsplashes.
      d. Countertop backsplashes and adjacent construction.

B. Work Not Included as Work of this Section:
   1. 04200, Unit Masonry; for masonry control and expansion joint fillers and gaskets.
   2. 08410, Aluminum Entrances and Windows; for factory-installed sealants in factory-glazed doors.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each joint sealer product required, including instruction for joint preparation and joint sealer application.

1.04 QUALITY ASSURANCE

A. Design Criteria:
1. Single Source Responsibility for Joint Sealer Materials: Obtain joint sealer materials from single manufacturer for each different product required.
2. Provide joint sealers that have been produced and installed to establish and maintain watertight and airtight continuous seals.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.06 PROJECT/SITE CONDITIONS

A. Environmental Conditions:
1. Do not proceed with installation of joint sealers under following conditions:
a. When ambient and substrate temperature conditions are outside limits permitted by joint sealer manufacturer or below 40 deg. F(4.4 deg. C).
b. When joint substrates are wet due to rain, frost, condensation, or other causes.

B. Joint Width Conditions: Do not proceed with installation of joint sealers when joint widths are less than allowed by joint sealer manufacturer for application indicated.

C. Sequence installation of joint sealers to occur not less than 21 nor more than 30 days after completion of waterproofing, unless otherwise indicated.

PART 2 PRODUCTS

2.01 MATERIALS

A. General:
1. Compatibility: Provide joint sealers, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience.
2. Use self-leveling compounds for horizontal joints and nonsag compounds for all other areas except as indicated or specified.
3. Sealant Color:
a. Concealed Joints: Use sealant with manufacturer's standard color having best overall performance qualities for indicated application.
b. Exposed Joints: Use sealant as selected from manufacturer's standard or special colors, as selected by Contracting Officer.

B. Elastomeric Joint Sealants:
1. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated which complies with ASTM C920 requirements, including those referenced for Type, Grade, Class, and Uses.
2. One-Part, Nonsag Urethane: Tremco Inc. Model Vulkem 116, Sika Corp. Model Sikaflex-1a, Sonneborn Building Products Model NP1.
3. One-Part, Pavement Pourable Urethane: Tremco Inc. Model Vulkem 45, Pecora Corp. Model HR-201, Sonneborn Building Products Model SL1.
4. Mildew-Resistant Silicone: Dow Corning Model 786, G.E. Silicones Model Sanitary 1700, Tremco Inc. Model Tremsil 600.

C. Latex Joint Sealers:
1. Silicone Emulsion Sealant:
a. Manufacturer's standard, one-part, nonsag, mildew-resistant, silicone-emulsion sealant complying with ASTM C834 and C920, formulated to be paintable and recommended for exposed

applications on interior and on protected exterior locations involving joint movement of max. +/-12 percent.

b. Product: Dow Corning Corp. Model Performance Plus Silicone Sealant.

D. Miscellaneous Joint Sealants:
1. Acoustical Sealant for Concealed Joints:
a. Manufacturer's standard, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound.
b. Product: Pecora Corp. Model BA-98, Tremco Inc. Model Tremco Acoustical Sealant.
2. Butyl-Polyisobutylene Sealant:
a. Manufacturer's standard, solvent-release-curing, butyl-polyisobutylene sealant complying with AAMA 809.2, recommended for concealed joints.
b. Product: Protective Treatments Inc. Model PTI 404.
3. Butyl-Polyisobutylene Tape Sealant:
a. Manufacturer's standard, solvent-free, butyl-polyisobutylene tape sealant with solids content of 100 percent, complying with AAMA 804.1; formulated to be nonstaining, paintable, and nonmigrating in contact with nonporous surfaces; packaged on rolls with release paper on one side; with or without reinforcement thread to prevent stretch.
b. Product: Pecora Corp. Model Extru-Seal Tape, Pecora Corp. Model Shim-Seal Tape, Protective Treatments Inc. Model PTI 606, Tremco Inc. Model Tremco 440 Tape.

E. Joint Sealant Backing:
1. General: Provide sealant backings of material and type which are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
2. Plastic Foam Joint Fillers:
a. Preformed, compressible, resilient, nonwaxing nonextruding strips of plastic foam of material indicated and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

b. Nongassing closed-cell polyethylene foam, subject to approval of sealant manufacturer.

3. Bond-Breaker Tape:
   a. Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing bond between sealant and joint filler or other materials at back, third surface, of joint.
   b. Provide self-adhesive tape where applicable.

F. Miscellaneous Material:
1. Primer: Provide type recommended by sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealer-substrate and field tests.
2. Cleaners for Nonporous Surfaces: Provide nonstaining chemical cleaner of type acceptable to manufacturer of sealant and sealant backing materials which are not harmful to substrates and adjacent nonporous materials.
3. Masking Tape: Provide nonstaining, nonabsorbent type compatible with joint sealants and to surfaces adjacent to joints.

PART 3 EXECUTION

3.01 PREPARATION

A. Surface Cleaning of Joints:
1. Clean out joints immediately before installing joint sealers to comply with recommendations of sealant manufacturers and following requirements.
2. Remove all foreign materials from joint substrates which could interfere with adhesion of joint sealer, including dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer; oil; grease; waterproofing; water-repellent; water; surface dirt; and frost.
3. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces, by brushing, grinding, blast cleaning, mechanical abrading, acid washing, or combination of these methods to produce clean, sound substrate capable of developing optimum bond with sealers.
4. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

5. Remove laitance and form release agents from concrete.

B. Joint Priming:
1. Prime joint substrates where indicated or where recommended by sealant manufacturer based on preconstruction joint sealer-substrate tests or prior experience.
2. Apply primer to comply with sealant manufacturer's recommendations.
3. Confine primers to area of joint sealer bond.
4. Do not allow spillage or migration to adjoining surfaces.

C. Masking Tape:
1. Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears.
2. Remove tape immediately after tooling without disturbing joint seal.

3.02 INSTALLATION

A. General:
1. Comply with sealant manufacturers' printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
2. Elastomeric Sealant Installation Standard:
a. Comply with recommendations of ASTM C962 for use of joint sealants as applicable to materials, applications, and conditions indicated.
b. Ensure building joint width at time of installation is 4 times expected joint movement.
3. Solvent-Release-Curing Sealant Installation Standard: Comply with requirements of ASTM C804 for use of solvent-release-curing sealants.
4. Latex Sealant Installation Standard: Comply with requirements of ASTM C790 for use of latex sealants.

B. Sealant Backings:
1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce cross-sectional shapes

and depths of installed sealants relative to joint widths which allow optimum sealant movement capability.

2. Do not leave gaps between ends of joint fillers.
3. Do not stretch, twist, puncture, or tear joint fillers.
4. Remove absorbent joint fillers which have become wet before sealant application and replace with dry materials.
5. Install bond breaker tape between sealants and joint fillers, compression seals, or back of joints where required to prevent third side adhesion of sealant to back of joint.
6. Install compressible seals serving as sealant backings to comply with requirements indicated for joint fillers.

C. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

D. Tooling of Nonsag Sealants:
1. Immediately after sealant application and before time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets and to ensure contact and adhesion of sealant with sides of joint.
2. Remove excess sealants from surfaces adjacent to joint.
3. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
4. Provide concave joint configuration per Figure 6A in ASTM C962, unless otherwise indicated.
5. Use making tape to protect adjacent surfaces of recessed tooled joints.

3.03 PROTECTION AND CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

B. Protection:
   1. Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at Substantial Completion.
   2. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

END OF SECTION

SECTION 08111

STANDARD STEEL DOORS AND FRAMES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: Work of this Section consists of installing all materials furnished under this Section, including all equipment, labor, services, and incidental items required to complete work as shown on Drawings and specified in this Section.
   1. SDI Level 1 (standard-duty Level C according to ANSI A250.4) Model 1 full flush (no seams on face surfaces) doors for:
      a. General interior nonrated door applications not covered by higher SDI Levels.
      b. Interior nonrated closet doors.
   2. SDI Level 2 (heavy-duty Level B according to ANSI A250.4) Model 1 full flush (no seams on face surfaces) doors for:
      a. Fire-rated entrance to stairwell (temperature rise opening).
      b. Interior fire-rated doors (nontemperature rise openings).
      c. Entrance to toilet rooms.
      d. Entrance to hospital patient rooms.
   3. SDI Level 3 (extra-heavy-duty Level A according to ANSI A250.4) Model 1 full flush (no seams on face surfaces) doors for:
      a. Exterior thermally-rated entrance doors.
      b. Exterior thermally-rated stairwell doors.
   4. Welded steel frames for all openings.

B. Related Sections:
   1. 04200, Unit Masonry; for installation of metal frames in masonry construction.
   2. 07901, Joint Sealants; for sealing perimeter of metal frames to adjacent construction.
   3. 08211, Flush Wood Doors; for installation of wood doors in metal frames.

4. 08710, Door Hardware; for application of finish hardware to metal doors and frames.
5. 08800, Glazing; for installation of glazing in metal borrow-light frames.
6. 09900, Painting; for field-applied finish paint to factory-primed metal doors and frames.

1.03 SUBMITTALS

A. Product Data: Submit for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.

B. Door Schedule: Use same reference designations indicated on Drawings.

1.04 QUALITY ASSURANCE

A. Reference Standards:
1. Steel Door and Frame Standard: Comply with ANSI A250.8.
2. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by testing and inspecting agency acceptable to authorities having jurisdiction based on testing according to NFPA 252.
   a. Test Pressure: Test at atmospheric pressure.
   b. Temperature Rise Rating: Max. 450 deg. F (250 deg. C) in 30 minutes of fire exposure.
3. Fire-Rated Window (Borrow Light) Assemblies: Comply with NFPA, listed and labeled, based on testing according to NFPA 257.

1.05 DELIVERY, STORAGE AND HANDLING

A. Delivery:
1. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage.
2. Inspect doors and frames on delivery for damage.
3. Minor damages may be repaired, provided refinished items are equal in all respects to new work and acceptable to Contracting Officer.
4. Remove and replace damaged items as directed.

B. Storage:
1. Store doors and frames at building site under cover.

2. Place units on min. 4 in. high wood blocking.
3. Avoid use of nonvented plastic or canvas shelters that could create humidity chamber.
4. If cardboard wrapper on door becomes wet, remove carton immediately.
5. Provide 1/4 in. spaces between stacked doors to promote air circulation.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Steel Doors and Frames: Benchmark Commercial Door Div. (General Products Co.), Curries Co., Mesker Door Co., Pioneer Industries Inc., Republic Builders Products, Steelcraft Div. (Ingersoll-Rand).

2.02 MATERIALS

A. Steel:
1. Exterior Locations - Galvanized Steel Sheets: Zinc-coated carbon cold-rolled (per ASTM A366) steel, Commercial Quality, comply with ASTM A653, Type B, with A40 (ZF126) zinc-iron alloy (galvannealed) coating; stretcher-leveled standard for flatness.
2. Interior Locations - Electrolytic Zinc-Coated Steel Sheet: ASTM A591, Commercial cold-rolled (per ASTM A366) Steel (CS), Class B coating; mill phosphatized; suitable for unexposed applications; stretcher-leveled standard of flatness where used for face sheets.

B. Anchors and Fasteners:
1. Supports and Anchors: Fabricate of min. 18 ga. steel, galvanized where used with galvanized frames.
2. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, comply with ASTM A153, Class C or D, as applicable.

C. Shop-Applied Paint:
1. Rust-inhibitive primer enamel or paint, either air-dried or baked, suitable as base for specified finish paints.
2. Comply with ANSI A224.1, Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

2.03 FABRICATION

A. General:
1. Fabricate units to be rigid, neat in appearance and free from defects, warp, or buckle.
2. Wherever practicable, fit and assemble units in manufacturer's plant.
3. To assure proper assembly at Project site, clearly identify work that cannot be permanently factory-assembled before shipment.
4. Comply with ANSI/SDI-100 requirements.
5. Clearances:
   a. Max. 1/8 in. at jambs and heads, except max. 1/4 in. between nonfire-rated pairs of doors.
   b. Max. 3/4 in. at bottom.
6. Tolerances: Comply with SDI 117, Manufacturing Tolerances Standard Steel Doors and Frames.
7. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

B. Doors:
1. Provide metal doors of types and styles or grades and models indicated on Drawings or Schedules.
2. Face Thickness:
   a. Level 1: 0.032 in. (20 ga.).
   b. Level 2: 0.042 in. (18 ga.).
   c. Level 3: 0.053 in. (16 ga.).
3. Internal Construction:
   a. Interior - Nonrated and Fire-Rated (Nontemperature Rise Openings): Manufacturer's standard honeycomb, fully-bonded, heat-cured, nip-rolled.
   b. Interior - Fire-Rated, Temperature Rise Openings (Stairwells): Rigid mineral fiber core with internal sound-deadener on inside of face sheets.
   c. Exterior - Uninsulated: Manufacturer's standard honeycomb.
   d. Exterior - Insulated: Manufacturer's standard foam.
4. Close top and bottom edges of exterior doors as integral part of door construction or by addition of min. 0.053 in. thick inverted steel channels.
5. Single-Acting, Door-Edge Profile: Beveled edge.

C. Frames:
1. General:
a. Provide steel frames that comply with ANSI A250.8 and with details indicated for type and profile.
b. Conceal fastenings, unless otherwise indicated.
2. Frame Thickness - Steel Doors:
a. Level 1: 0.042 in. (18 ga.).
b. Level 2: 0.053 in. (16 ga.).
c. Level 3: 0.067 in. (14 ga.).
3. Frame Thickness - Wood Doors:
a. Interior Closets and Storage Rooms: 0.042 in. (18 ga.).
b. Interior Passage Doors: 0.053 in. (16 ga.).
4. Frame Thickness - Borrow Lights: 0.067 in. (14 ga.).
5. Door Silencers: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single door frames and 2 silencers on heads of double door frames.
6. Plaster Guards: Provide min. 0.016 in. (26 ga.). steel plaster guards or mortar boxes frame, at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.
7. Supports and Anchors:
a. Fabricated from min. 0.042 in. (18 ga.) thick, electrolytic zinc-coated for interior locations or metallic-coated steel sheet for exterior locations.
b. Wall Anchors in Masonry Construction: 0.177-in. dia. steel wire complying with ASTM A510 may be used in place of steel sheet.
8. Inserts, Bolts, and Fasteners:
a. Manufacturer's standard units.
b. Where zinc-coated items are to be built into exterior walls, comply with ASTM A153, Class C or D as applicable.

D. Thermal-Rated (Insulating) Assemblies:
1. Exterior Locations: As Scheduled, provide doors that have been fabricated as thermal insulating door and frame assemblies and tested to comply with ASTM C236.
2. Unless otherwise indicated, provide thermal-rated assemblies with 0.24 Btu per (hr. sq. ft. deg. F) or better U-factor.

E. Labeled and Fire-Rated Assembly: In addition to general fabrication requirements for doors and frames, provide assemblies complying with following performance criteria.
   1. Doors: 0.167 in. (4.2mm) steel plate hinge reinforcement, 12 ga. closer reinforcement, and 0.093 in. (2.3mm) lock front reinforcement.
   2. Frames: 0.053 in. (1.3mm) welded at miter point and ground smooth.
   3. Labeling: Underwriter's Laboratories (UL), Factory Mutual (FM), or Warnock Hersey.

F. Glazing Stops:
   1. Min. 0.032 in. (20 ga.) steel.
   2. Provide nonremovable stops on outside of exterior doors and on secure side of interior doors for glass.
   3. Provide screw-applied removable glazing beads on inside of glass, louvers, and other door panels.

G. Finish Hardware Preparation:
   1. Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier.
   2. Comply with applicable requirements of ANSI A115 Series Specifications for door and frame preparation for hardware.
   3. For concealed overhead door closers, provide space, cutouts, reinforcing, and provisions for fastening in top rail of doors or head of frames, as applicable.
   4. Reinforce doors and frames to receive surface-applied hardware.
   5. Drilling and tapping for surface-applied finish hardware may be done at Project site.
   6. Locate finish hardware as shown on final shop drawings or, if not shown, in accordance with Recommended Locations for Builder's Hardware, published by Door and Hardware Institute.

H. Shop-Painting:
   1. Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.
   2. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.

3. Apply shop coat of prime paint of even consistency to provide uniformly-finished surface ready to receive finish paint.

PART 3 EXECUTION

3.01 INSTALLATION

A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as specified.

B. Placing Frames:
1. Comply with provisions of SDI-105, Recommended Erection Instructions for Steel Frames, unless otherwise indicated.
2. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set.
3. After wall construction is complete, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
4. Masonry Construction: Locate 3 wall anchors per jamb at hinge and strike levels.
5. Install fire-rated frames in accordance with NFPA 80.
6. Metal Stud Partitions: Install at least 3 wall anchors per jamb at hinge and strike levels.

C. Door Installation:
1. Fit hollow metal doors accurately in frames within clearances specified in ANSI A250.8 and shim as required to comply with SDI 122 and ANSI/DHI A115.1G.
2. Place fire-rated doors with clearances as specified in NFPA 80.
3. Install smoke control doors to comply with NFPA 105.

3.02 ADJUSTING AND CLEANING

A. Prime Coat Touchup: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply compatible air-drying primer touchup.

B. Final Adjustments: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION

SECTION 08211

FLUSH WOOD DOORS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: Work of this Section consists of installing all materials furnished under this Section, including all equipment, labor, services, and incidental items required to complete work as shown on Drawings and specified in this Section.
   1. Solid core doors with wood veneer faces.
   2. Factory-finishing of doors.
   3. Factory-prefitting to frames and factory-premachining for hardware for doors.
   4. Tempered safety glass factory-installed in wood doors.

B. Related Sections:
   1. 08111, Standard Steel Doors and Frames; for metal door frames.
   2. 08710, Door Hardware; for application of finish hardware to wood doors.
   3. 09900, Painting; for field-applied finish paint to wood doors.

1.03 SUBMITTALS

A. Product Data: Submit for each type of door, including details of core and edge construction, trim for openings, and factory-finishing specifications.

B. Samples for Verification: Submit in form and size indicated below:
   1. Door Corner Sections:
      a. Submit 12 in. sq., with door faces and edging representing typical range of color and grain for each specie of veneer and solid lumber required.
      b. Finish sample with same materials proposed for factory-finished doors.

2. Frames for Light Openings: 6 in. lengths, for each material, type, and finish required.

1.04 QUALITY ASSURANCE

A. Reference Standards:
1. AWI Quality Standard: Section 1300, Architectural Flush Doors, for door grade, core construction, finish, and other requirements.

B. Fire-Rated Wood Doors:
1. Provide wood doors that comply with NFPA 80; are identical in materials and construction to units tested in door and frame assemblies per ASTM E252; and are labeled and listed by UL, Warnock Hersey, or another testing and inspection agency acceptable to authorities having jurisdiction.
2. Test Pressure: After 5 minutes into test, establish neutral pressure level in furnace to 40 in. (1000mm) or less above sill.

C. Single Source Responsibility: Obtain doors from one source and by single manufacturer.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Protection:
1. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration.
2. Comply with requirements of referenced standards and manufacturer's instructions.

B. Identify each door with individual opening numbers as designated on shop drawings using temporary, removable, or concealed markings.

1.06 PROJECT CONDITIONS

A. Conditioning, AWI Standards:
1. Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during remainder of construction period to comply with following requirements applicable to project's geographical location.
2. Section 100-S-11, Relative Humidity and Moisture Content.

1.07 WARRANTY

A. General: Door manufacturer's warranty specified in this Article shall not deprive Government of other rights Government may have under other provisions of Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

B. Door Manufacturer's Warranty:
1. Submit written agreement on door manufacturer's standard form signed by manufacturer, installer, and Contractor, agreeing to repair or replace defective doors having warped (bow, cup, or twist) more than 1/4 in. in 42 in. x 83 in. section or that shows telegraphing of core construction in face veneers exceeding 0.01 in. in 3 in. span, or do not conform to tolerance limitations of referenced quality standards.
2. Provide additional warranty to include installation and finishing that may be required due to repair or replacement of defective doors where defect was not apparent before hanging.
3. Solid Core Interior Doors: Life of installation.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Solid Core Doors with Wood Veneer Faces - SCL-5 Construction: Algoma Hardwoods Inc., Eggers Industries (Architectural Door Div.), Marshfield Door Systems Inc. (formerly Door Division of Weyerhauser), VT Industries Inc.

2.02 MATERIALS

A. Doors - Transparent Finish:
1. Grade: AWI Premium with Grade A faces.
2. Specie and Cut: Red oak, plain-sliced.
3. Veneer Leaves Match: Bookmatch.
4. Veneer Leaves Assembly on Door Faces: Center balance.
5. Pair and Set Match: Provide for doors hung in same opening.
6. Room Match: Provide door faces of compatible color and grain within each separate room or building area.
7. Stiles: Solid hardwood, min. 1-3/8 in. wide.

8. Core: Structural composite lumber.
9. Finish: AWI-TR6, factory-applied.

B. Doors - Transparent Finish, Fire-Rated:
1. Grade: AWI Premium with Grade A faces, fire-rated.
2. Specie and Cut: Red oak, plain-sliced.
3. Veneer Leaves Match: Bookmatch.
4. Veneer Leaves Assembly on Door Faces: Center balance.
5. Pair and Set Match: Provide for doors hung in same opening.
6. Room Match: Provide door faces of compatible color and grain within each separate room or building area.
7. Stiles: Solid hardwood, min. 1-3/8 in. wide.
8. Core: Incombustible mineral core.
9. Finish: AWI-TR6, factory-applied.

C. Light Frames:
1. Wood Beads for Light Openings: Manufacturer's standard fire-rated wood veneer beads matching veneer species of door faces.

2.03 FABRICATION

A. General: Fabricate flush wood doors to comply with following requirements:
1. In sizes indicated for job-site fitting.
2. Factory-fit doors to suit frame-opening sizes indicated, with following uniform clearances and bevels:
a. Comply with clearance requirements of referenced Quality Standard for fitting.
b. Comply with requirements of NFPA 80 for fire-resistance-rated doors.
3. Finish Hardware:
a. Factory-machine doors for hardware that is not surface-applied.
b. Locate hardware to comply with DHI-WDHS-3.
c. Comply with final Hardware Schedule, door frame shop drawings, DHI A115-W Series standards, and hardware templates.
d. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory-premachining.
4. Openings:
a. Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of doors required.

b. Light Openings: Trim openings with moldings of material and profile indicated.

PART 3 EXECUTION

3.01 INSTALLATION

A. Hardware: Refer to Section 08710 for installation.

B. Manufacturer's Instructions:
1. Install wood doors to comply with manufacturer's instructions, referenced AWI Standard, and as indicated.
2. Install fire-rated doors in corresponding fire-rated frames in accordance with requirements of NFPA 80.

C. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at job site.

3.02 ADJUSTING AND PROTECTION

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Refinish or replace doors damaged during installation.

C. Protect doors as recommended by door manufacturer to ensure wood doors will be without damage or deterioration at Substantial Completion.

END OF SECTION

SECTION 08300

OVERHEAD DOORS AND GRILLES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: Work of this Section consists of installing all materials furnished under this Section, including all equipment, labor, services, and incidental items required to complete work as shown on Drawings and specified in this Section.
   1. Overhead coiling grilles, including curtains, guides, counterbalance mechanisms, hardware, operators, and installation accessories.
   2. Insulated steel, prefinished overhead sectional door with personnel hinged door, including guides, counterbalance mechanism, hardware, and installation accessories.

B. Related Sections:
   1. 09900, Painting; ; for field-applied exterior opaque metal finish.

1.03 SUBMITTALS

A. Product Data:
   1. Product data, roughing-in diagrams and installation instructions for each type and size of overhead assembly.
   2. Include operating instructions and maintenance data.

B. Shop Drawings: Submit for special components and installations are not fully dimensioned or detailed in manufacturer's product data.

1.04 QUALITY ASSURANCE

A. Design Criteria:
   1. Provide each overhead assembly as complete unit furnished by one manufacturer, including hardware, accessories, mounting, and installation components.
   2. Furnish overhead assembly units by one manufacturer for entire Project.
   3. Insert and Anchorages:
      a. Furnish inserts and anchoring devices that must be set in concrete or built into masonry for installation of units.
      b. Provide setting drawings, templates, instructions, and directions for installing anchorage devices.
      c. Coordinate delivery with other work to avoid delay.
      d. Refer to Concrete and Masonry Sections for installation of inserts and anchorage devices.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Coiling Grille: Apton Rolling Doors A Gichner Systems Group Inc., Atlas Roll-Lite Overhead Doors/Div. MASCO, Ceco/Windsor-Div. Ceco Corp., The Cookson Co., Cornell Iron Works Inc., Dynamic Closures Corp., Mahon Door Corp., Overhead Door Corp., Pacific Rolling Door Co., Raynor Garage Doors, Southwestern Steel Rolling Door Co., J.G. Wilson Corp.

B. Sectional Overhead Door: McKee Door Co., Overhead Door Co., Raynor Manufacturing Co., Ceco Corp.

2.02 MATERIAL

A. Grille Curtain:
   1. General: Fabricate grille curtain consisting of network of min. 5/16 in. dia. horizontal rods spaced approximately 2 in. o.c. and rotating on rods.
   2. Aluminum Grilles: ASTM B221, with clear satin anodized finish.
   3. Bottom Bar:
      a. Manufacturer's standard extruded shape or two angles, finished to match grille.
      b. Provide replaceable flexible vinyl or neoprene continuous floor bumper at underside of bar.

4. End Locks: Continuous end links or other devices at ends of rods, locking and retaining grille curtain in guides against excessive pressures, maintaining curtain alignment and preventing lateral movement.
5. Guides:
   a. Manufacturer's standard extruded aluminum shape having curtain groove with return lips or bars to retain curtain.
   b. Furnish pile strips, rigid vinyl liner, or other nonmetallic inserts to prevent metal-to-metal contact and minimize travel noise.
   c. Furnish removable stops on guides to prevent curtain overtravel.

B. Steel Sections:
1. General: Construct door sections from galvanized structural quality carbon steel sheets complying with ASTM A446, Grade A, or ASTM A526, min. 33,000 psi yield strength and minimum G90 zinc coating complying with ASTM A525.
2. Steel Sheet Thickness: 0.016 in.
3. Exterior Section Face: Ribbed textured.
4. Fabrication:
   a. Fabricate sections from single sheet to provide units max. 24 in. high, and nominal 2 in. deep.
   b. Roll horizontal meeting edges to continuous shiplap, rabbeted, or keyed weather seal, with reinforcing flange return.
   c. Enclose open section with 16 gage galvanized steel channel end stiles welded in place.
   d. Provide intermediate stiles, cut to door section profile, max. 48 in. o.c. and welded in place.
   e. Reinforce bottom section with continuous channel or angle conforming to bottom section profile.
   f. Reinforce sections with continuous horizontal and diagonal reinforcing, as required by door width and design wind loading.
   g. Provide galvanized steel bars, struts, trusses or strip steel, formed to depth, and bolted or welded in place.
5. Insulation:
   a. Insulate inner core of steel sections with manufacturer's standard glass fiber or polyurethane foam-type insulation.
   b. Enclose insulation with manufacturer's standard steel sheet secured to door panel.

6. Finish:
   a. Pretreat zinc-coated steel with zinc phosphate conversion coating after cleaning.
   b. Apply manufacturer's standard prime and finish coats, applied to interior and exterior door faces.

C. Counterbalancing Mechanism - Coiling Grille:
1. General:
   a. Counterbalance grille with steel helical torsion spring mounted around steel shaft and contained in spring barrel connected to curtain.
   b. Use grease-sealed ballbearings or self-lubricating graphite bearings for rotating members.
2. Counterbalance:
   a. Hot-formed, structural-quality carbon steel, welded or seamless pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion and limit barrel deflection to max. 0.03 in. per ft. of span under full load.
   b. Furnish spring balance of one or more oil-tempered, heat-treated steel helical torsion springs.
   c. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel.
   d. Provide cast steel barrel plugs to secure ends of springs to barrel and shaft.
   e. Fabricate torsion rod for counterbalance shaft of case-hardened steel, sized to hold fixed spring ends and carry torsional load.
3. Brackets: Manufacturer's standard design, either cast iron or cold-rolled steel plate.
4. Hood - General:
   a. Form to entirely enclose coiled curtain and operating mechanism at opening head.
   b. Contour to suit end brackets to which hood is attached.
   c. Roll and reinforce top and bottom edges for stiffness.
   d. Provide closed ends for surface-mounted hoods, and any portion of between-jamb mounting projecting beyond wall face.
   e. Provide intermediate support brackets as required to prevent sag.

5. Aluminum Hoods: Fabricate hoods for aluminum grilles of alloy 3003 aluminum sheet, min. 0.032 in. thick, finished to match curtain.
6. Tubular Steel Columns: Provide for large grille curtains, as detailed.

D. Tracks, Supports and Accessories - Sectional Door:
   1. Tracks:
      a. Provide manufacturer's standard galvanized steel track system, sized for door size and weight, and designed for clearances shown.
      b. Provide complete track assembly including brackets, bracing and reinforcing for rigid support of ball bearing roller guides, for required door type and size.
      c. Slot vertical sections of track 2 in. o.c. for door drop safety device.
      d. Slope tracks at proper angle from vertical, or otherwise design to ensure tight closure at jambs when door unit is closed.
      e. Weld or bolt to track supports.
   2. Track Reinforcement and Supports:
      a. Provide galvanized steel track reinforcement and support members.
      b. Secure, reinforce and support tracks as required for size and weight of door to provide strength and rigidity, and to ensure against sag, sway, and detrimental vibration during opening and closing of doors.
      c. Support and attach tracks at opening jambs with continuous angle welded to tracks and attached to wall.
      d. Support horizontal ceiling tracks with continuous angle welded to track and supported by laterally-braced attachments to overhead structural members at curve and end of tracks.
   3. Weather Seals:
      a. Provide continuous, rubber, neoprene, or flexible vinyl adjustable weatherstrip gasket at tops and compressible astragal on bottoms of each overhead door.
      b. Provide continuous flexible seals at door jamb edges for fully weathertight installation.

E. Hardware - Sectional Door:
   1. General: Provide heavy-duty, rust-resistant hardware, with galvanized or cadmium-plated or stainless steel fasteners, to suit type of door.

2. Hinges:
   a. Provide heavy steel hinges at each end stile and at each intermediate stile, per manufacturer's recommendations for size of door.
   b. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts.
   c. Use rivets or self-tapping fasteners where access to nuts is not possible.
   d. Provide double-end hinges, where required, for doors exceeding 16 ft. -0 in. in width, unless otherwise recommended by door manufacturer.
3. Rollers:
   a. Provide heavy-duty rollers, with steel ball bearings in case-hardened steel races, mounted with varying projections to suit slope of track.
   b. Extend roller shaft through both hinges where double hinges are required.
   c. Provide roller tires to suit size of track 3 in. dia. for 3 in. track; 2 in. dia. for 2 in. track.
   d. Case-hardened steel tires, for normal installations.

F. Counterbalancing Mechanisms - Sectional Door:
1. Extension Spring:
   a. Hang door assembly for operation by extension spring counterbalance mechanism with aircraft-type steel cable over ball-bearing sheaves.
   b. Provide oil tempered wired springs with internal safety rods.
   c. Combine operation with spring bumper in each horizontal track to cushion door at end of opening operation.
2. Torsion Spring:
   a. Hang door assembly for operation by torsion spring counterbalance mechanism, consisting of adjustable tension tempered steel torsion springs mounted on case-hardened steel shaft, and connected to door with galvanized aircraft-type lift cable.
   b. Provide cast aluminum or grey iron casting cable drums, grooved to receive cable.
   c. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of shaft with 1 additional midpoint bracket for shafts up to 16 ft. long and 2

additional brackets at 1/3-points to support shafts over 16 ft. long, unless closer spacing recommended by door manufacturer.

d. Include spring-loaded steel or bronze cam mounted to bottom door roller assembly on each side, designed to stop door automatically if either cable breaks.

e. Provide either compression spring or leaf spring bumper installed at end of each horizontal track to cushion door at end of opening operation.

G. Manual Operation:

1. Grille:

a. Furnish manual chain hoist operator consisting of endless steel hand chain, chain pocket wheel and guard, and geared reduction unit with max.

b. 35 lb. pull for door operation.

c. Furnish alloy steel hand chain with chain holder secured to operator guide.

2. Sectional:

a. Provide direct-drive chain hoist, side-mounted unit, consisting of endless steel hand chain, cast iron pocket pulley and chain guard, mounted on counterbalance shaft as shown, and operating with max. 35 lbs. pull.

b. Connect to door through secondary drive roller chain and sprocket and operate at max. 35 lbs. pull.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install assembly and operating equipment, complete with necessary hardware in accordance with final shop drawings, manufacturer's instructions, and as specified.

B. After completing installation, including work by other trades, lubricate, test, and adjust assembly to operate easily, free from warp, twist, or distortion.

END OF SECTION

SECTION 08311

ACCESS DOORS AND FRAMES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: Work of this Section consists of installing all materials furnished under this Section, including all equipment, labor, services, and incidental items required to complete work as shown on Drawings and specified in this Section.
   1. Flush, insulated, fire-rated access doors and frames with exposed trim for:
      a. Masonry wall surfaces.
      b. Ceramic tile wall surfaces.
   2. Flush, insulated, fire-rated access doors and trimless frames for gypsum board wall and ceiling surfaces.
   3. Recessed access doors and trimless frames for:
      a. Gypsum board wall and ceiling surfaces.
      b. Acoustical tile ceiling surfaces.

B. Related Sections:
   1. 03300, Cast-In-Place Concrete; for blocking out openings for access doors and frames in concrete.
   2. 04200, Unit Masonry; for anchoring and grouting access door frames set in masonry construction.
   3. 08710, Door Hardware; for mortise or rim cylinder locks and master keying.
   4. 09255, Gypsum Board Assemblies; for coordinating placement of frames to receive joint compound and tape.
   5. Division 15, Plumbing; for sizing and locating access doors and frames to service plumbing shutoffs.
   6. Division 15, HVAC; for sizing and locating access doors and frames to service heating equipment and controls.
   7. Division 16, Electrical; for sizing and locating access doors and frames to service electrical controls and equipment.

C. Work not Included as Work of this Section:
1. Division 15, Mechanical; for heating and air-conditioning duct access doors included as part of duct system.

1.03 SUBMITTALS

A. Product Data:
1. Submit in form of manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions, and directions for installation of anchorage devices.
2. Include complete Schedule, including types, general locations, sizes, wall and ceiling construction details, finishes, latching or locking provisions, and other data pertinent to installation.

B. Schedule: Provide complete Door and Frame Schedule, including types, general locations, sizes construction details, latching or locking provisions, and other data pertinent to installation.

1.04 QUALITY ASSURANCE

A. Single-Source Responsibility: Obtain access doors for entire Project from one source from single manufacturer.

B. Fire-Rated Access Doors and Frames:
1. Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics per following test methods and labeled and listed by UL.
a. NFPA 252 or UL 10B for vertical access doors.
b. ASTM E119 or UL 263 for horizontal access doors and frames.

1.05 PROJECT CONDITIONS

A. Verification: Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment, and indicate on Submittal Schedule.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Access Doors: Bar-Co. Inc. Div. (Alfab, Inc.), Cierra Products, J. L. Industries Inc., Karp Associates Inc.,

Larsen's Manufacturing Company, MIFAB Manufacturing Inc., Milcor Limited Partnership, Nystrom Building Products Co.

2.02 MATERIALS

A. Flush, Insulated, Fire-Rated Access Doors and Frames with Exposed Trim:
   1. Fabricated from steel sheet.
   2. Fire-Resistance Rating: As required at wall assembly.
   3. Temperature Rise Rating: 250 deg. F(139 deg. C) at end of 30 minutes.
   4. Door: Flush panel with mineral-fiber insulation core enclosed in sheet metal with min. 0.036 in. thickness.
   5. Frame: Min. 0.060 in. thick sheet metal with 1 in. wide, surface-mounted trim.
   6. Hinges: Continuous piano hinge.
   7. Automatic Closer: Spring-type.
   8. Lock: Key-operated cylinder lock.

B. Flush, Insulated, Fire-Rated Access Doors and Trimless Frames:
   1. Fabricated from steel sheet.
   2. Fire-Resistance Rating: As required at wall or ceiling assembly.
   3. Temperature Rise Rating: 250 deg. F(139 deg. C) at end of 30 minutes.
   4. Door: Flush panel with mineral-fiber insulation core enclosed in sheet metal with min. 0.036 in. thickness.
   5. Frame: Min. 0.060 in. thick sheet metal with drywall bead.
   6. Hinges: Continuous piano hinge.
   7. Automatic Closer: Spring-type.
   8. Locking: Key-operated cylinder lock.

C. Recessed Access Doors and Trimless Frames:
   1. Fabricated from steel sheet.
   2. Door: Min. 0.060 in. steel sheet metal in form of pan recessed 5/8 in. for gypsum board, gypsum base, acoustical tile infill.
   3. Frame: Min. 0.060 in. thick sheet metal with drywall bead for gypsum board surfaces, plaster bead for plaster surfaces, only frame edge exposed in acoustical ceiling surfaces.
   4. Hinges: Continuous piano hinge.
   5. Lock: Key-operated cylinder lock.

2.03 FABRICATION

A. General: Provide access door assemblies manufactured as integral units ready for installation.

B. Metal Surfaces:
1. For metal surfaces exposed-to-view in completed work, provide materials with smooth, flat surfaces without blemishes.
2. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Steel Doors and Frames:
1. Grind exposed welds smooth and flush with adjacent surfaces.
2. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
3. Exposed Flanges: Nominal 1 in. wide around perimeter of frame.
4. For trimless frames with drywall bead for installation in gypsum board assembly, provide edge trim for gypsum board securely attached to perimeter of frames.
5. Provide mounting holes in frames to attach frames to metal or wood framing in plaster and drywall construction and to attach masonry anchors in masonry construction.
6. Furnish adjustable metal masonry anchors.
7. Recessed Access Doors: Form panel face to provide recess for application of applied finish; reinforce panel as required to prevent buckling.

D. Latching Mechanisms:
1. Furnish number required to hold doors in flush, smooth plane when closed.
2. Cylinder Lock: Furnish two keys per lock and key all locks alike.
3. Recessed Panel Doors: Provide access sleeves for each locking device.
4. Furnish plastic grommets and install in holes cut through finish.

E. Finish:
1. Galvanizing of Steel Shapes and Plates:
a. Hot-dip galvanize items indicated to comply with applicable standard listed.

b. ASTM A123, for galvanizing steel and iron products.
c. ASTM A153, for galvanizing steel and iron hardware.
d. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants.
e. Galvanized Surfaces: After cleaning, apply conversion coating suited to organic coating to be applied over it.
f. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
g. Factory-Priming for Field-Painted Finish: Apply shop primer immediately after cleaning and pretreating.

PART 3 EXECUTION

3.01 INSTALLATION

A. Comply with manufacturer's instructions for access door installation.

B. Coordinate installation with work of other trades.

C. Set frames accurately in position and securely attach to supports with face panel plumb or level in relation to adjacent finish surfaces.

3.02 ADJUST AND CLEAN

A. Adjust hardware and panels after installation for proper operation.

B. Remove and replace warped, bowed, or damaged panels or frames.

END OF SECTION

SECTION 08410

ALUMINUM ENTRANCES AND WINDOWS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: Work of this Section consists of installing all materials furnished under this Section, including all equipment, labor, services, and incidental items required to complete work as shown on Drawings and specified in this Section.
   1. Exterior entrance doors.
   2. Vestibule doors matching entrance doors.
   3. Sidelights.
   4. Frames for entrances.
   5. Frames for field-glazed fixed windows.
   6. Factory-glazed hopper windows.

B. Related Sections:
   1. 07901, Joint Sealants; for sealing perimeter of frames to adjoining construction.
   2. 08710, Door Hardware; for finish door hardware.
   3. 08800, Glazing; for installation of glazing into site-erected frames.

1.03 SYSTEM DESCRIPTION

A. Performance:
   1. General: Provide aluminum entrance assemblies complying with specified performance characteristics, as demonstrated by testing manufacturer's corresponding stock assemblies according to test methods indicated.
   2. Thermal Movement:
      a. Design aluminum entrance framing systems to provide for expansion and contraction of component materials.
      b. Entrance doors shall function normally over specified temperature range.
      c. Provide system capable of withstanding metal surface temperature range of 180 deg. F(100

deg. C) without buckling, failure of joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance, stress on glass, or other detrimental effects.

3. Design Requirements:
   a. Provide aluminum entrance systems complying with structural performance, air infiltration, and water penetration requirements indicated.
   b. Wind Loads: Provide aluminum entrance assemblies capable of withstanding wind pressures of min. 20 psf inward and min. 20 psf outward acting normal to plane of wall, with final design wind pressures determined by shop drawings submittal calculations and code compliance requirements.
4. Structural Performance:
   a. Conduct tests for structural performance in accordance with ASTM E330; at conclusion of tests there shall be no glass breakage or permanent damage to fasteners, anchors, hardware, or actuating mechanism.
   b. Framing members shall have no permanent deformation in excess of 0.2 percent of their clear span.
5. Deflection Normal to Plane of Wall:
   a. Test pressure required to measure deflection of framing members normal to plane of wall shall be equivalent to wind load specified above.
   b. Deflection shall not exceed 1/175 of clear span, when subjected to uniform load deflection test.
6. Deflection Parallel to Plane of Wall:
   a. Test pressures required to measure deflection parallel to plane of wall shall be equal to 1.5 times wind pressures specified above.
   b. Deflection of any member carrying its full dead load shall not exceed amount that will reduce glass bite below 75 percent of design dimension and shall not reduce edge clearance between member and fixed panel, glass, or other fixed member above to less than 1/8 in.
   c. Clearance Between Member and Operable Door or Window: Min. 1/16 in.
7. Air Infiltration: Provide aluminum entrance framing system with air infiltration rate of max. 0.06 CFM per sq. ft. of fixed area, excluding

operable door edges, when tested in accordance with ASTM E283 at inward test pressure differential of 1.57 psf.

8. Water Penetration: Provide framing systems with no uncontrolled water penetration, excluding operable door edges, as defined in test method when tested in accordance with ASTM E331 at inward test pressure differential of 6.24 lbf per sq. ft.
9. Condensation Resistance: Where framing systems are thermal-break construction, provide units tested for thermal performance in accordance with AAMA 1503 showing condensation resistance factor (CRF) of min. 45.
10. Thermal Transmittance: Provide framing systems having max. 0.65 Btu/(hr x sq. ft. x deg. F) overall U-value at 15 mph exterior wind velocity when tested in accordance with AAMA 1503.
11. Engineering Responsibility: Engage fabricator who assumes undivided responsibility for engineering framing by employing qualified professional engineer to prepare design calculations, shop drawings, and other structural data.

1.04 SUBMITTALS

A. Product Data: Submit for each aluminum entrance system required, including:
   1. Manufacturer's standard details and fabrication methods.
   2. Data on finishing, hardware, and accessories.
   3. Recommendations for maintenance and cleaning of exterior surfaces.

B. Shop Drawings: Submit for each aluminum entrance system required, including:
   1. Layout and installation details, including relationship to adjacent work.
   2. Elevations at 1/4 in. scale.
   3. Detail sections of typical composite members.
   4. Anchors and reinforcement.
   5. Hardware mounting heights.
   6. Provisions for expansion and contraction.
   7. Glazing details.
   8. Show reinforcing channels, opening framing, supplemental framing, splices, accessories, connection details, and attachments to other units of work.
   9. For framing indicated to comply with certain design loadings, include structural analysis data sealed

and signed by licensed structural engineer who was responsible for its preparation and is registered in State of Connecticut.

C. Samples for Initial Color Selection:
   1. Submit pairs of samples of each specified color and finish on 12 in. long sections of extrusions or formed shapes.
   2. Where normal color variations are anticipated, include 2 or more units in each set of samples indicating extreme limits of color variations.

D. Samples for Verification Purposes: Contracting Officer reserves right to require additional samples showing fabrication techniques and installation and design of hardware and accessories.

1.05 QUALITY ASSURANCE

A. Qualifications:
   1. Installer: Engage experienced Installer who has completed installations of aluminum entrances similar in design and extent to those required for Project and whose work has resulted in construction with record of successful in-service performance.
   2. Manufacturer: Provide aluminum entrances systems produced by firm experienced in manufacturing systems similar to those indicated for this Project and having record of successful in-service performance.
   3. Fabricator Qualifications:
      a. Provide aluminum entrances systems fabricated by firm experienced in producing systems similar to those indicated for this Project and having record of successful in-service performance.
      b. Fabricator shall have sufficient production capability to produce components required without causing delay in work progress.

B. Single Source Responsibility: Obtain aluminum entrance systems from one source and from single manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver aluminum entrance components in manufacturer's original protective packaging.

B. Store aluminum components in clean, dry location away from uncured masonry or concrete.

C. Cover components with waterproof paper, tarpaulins, or polyethylene sheeting to permit circulation of air.

D. Stack framing components to prevent bending and avoid significant or permanent damage.

1.07 PROJECT CONDITIONS

A. Field Measurements:
1. Check openings by accurate field measurement before fabrication to ensure proper fitting of work; show measurements on final shop drawings.
2. Coordinate fabrication schedule with construction progress to avoid delay in work.
3. Where necessary, proceed with fabrication without field measurements, and coordinate fabrication tolerances to ensure proper fit.

1.08 WARRANTY

A. Special Project Warranty:
1. Submit written warranty, executed by Contractor, Installer, and Manufacturer, agreeing to repair or replace units, including reglazing, which fail in materials or quality of fabrication and installation within specified warranty period.
2. Failures include, but are not necessarily limited to, structural failures including excessive deflection, excessive leakage or air infiltration, faulty operation, and deterioration of metals, metal finishes, and other materials beyond normal weathering.
3. Warranty shall not deprive Government of other rights or remedies Government may have under other provisions of Contract Documents, and is in addition to and runs concurrent with other warranties made by Contractor under requirements of Contract Documents.
4. Warranty period for aluminum entrance is 3 years after Substantial Completion.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Manufacturer: Amarlite Architectural Products, Kawneer Company Inc., PPG Industries, Tubelite Division of Indal Inc., Vistawall Architectural Products.

2.02 MATERIALS

A. Metals:
1. Aluminum Members: Provide alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish; ASTM B221 for extrusions, ASTM B209 for sheet/plate, and ASTM B211 for aluminum bars, rods, and wire.
2. Carbon steel reinforcement of aluminum framing members shall comply with ASTM A36 for structural shapes, plates, and bars, ASTM A611 for cold-rolled sheet and strip, or ASTM A570 for hot-rolled sheet and strip.

B. Glass and Glazing Materials: Comply with requirements of Section 08800 for insulating float glass unit, single tempered safety glass, and single float glass to comply with code requirements and as scheduled on Drawings.

C. Fasteners:
1. Aluminum, nonmagnetic stainless steel, zinc plated steel, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum components, hardware, anchors, and other components.
2. Reinforcement: Where fasteners screw-anchor into aluminum min. 0.125 in. thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard noncorrosive pressed-in splined grommet nuts.
3. Exposed Fasteners:
a. Do not use exposed fasteners except for application of hardware.
b. For application of hardware, use Phillips flat-head machine screws matching finish of member or hardware being fastened.

D. Accessories:
1. Concealed Flashing: Dead-soft stainless steel, min. 26 ga. or extruded aluminum, min. 0.026 in. of

alloy and type selected by manufacturer for compatibility with other components.

2. Brackets and Reinforcements: Manufacturer's high-strength aluminum brackets and reinforcements; otherwise, provide nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A123.
3. Concrete/Masonry Inserts: Cast iron, malleable iron, or hot-dip galvanized steel complying with ASTM A386.
4. Compression Weatherstripping: Manufacturer's standard replaceable weatherstripping gaskets of molded neoprene complying with ASTM D2000 or molded PVC complying with ASTM D2287.
5. Sliding Weatherstripping: Manufacturer's standard replaceable stripping of wool, polypropylene, or nylon woven pile, with nylon fabric or aluminum strip backing, complying with AAMA 701.2.

E. Hardware: Refer to Section 08710 for requirements and hardware items.

F. Door Assembly Components:
1. Entrance Door Frames:
   a. Provide tubular and channel frame assemblies, as indicated, with welded or mechanical joints in accordance with manufacturer's standards; reinforce as necessary to support required loads.
   b. Product: Kawneer Co. Model 500 Series.
2. Stile-and-Rail-Type Aluminum Doors:
   a. Frame: Provide tubular frame members, fabricated with mechanical joints using heavy inserted reinforcing plates and concealed tie-rods or j-bolts.
   b. Glazing: Fabricate doors to facilitate replacement of glass or panels, without disassembly of stiles and rails.
   c. Provide snap-on extruded aluminum glazing stops, with exterior stops anchored for nonremoval.
   d. Design: Provide 1-3/4 in. thick doors of design indicated.
   e. Product: Kawneer Co. Model 500 Series.

G. Hopper Windows:
1. Hopper Windows: Comply with AAMA/NWWDA 101/I.S.2 for following tests.
   a. Hardware Load Test.
   b. Sash Torsion Test.

c. Torsion Test.
d. Horizontal Concentrated Load Test on Latch Rail.
e. Vertical Concentrated Load Test on Latch Rail.
f. Torsion Load Test on Intermediate Frame Rails.
g. Vertical Concentrated Load Test on Intermediate Frame Rails.
h. Balance Arm Load Test.

2. Hardware:
   a. Operator: Gear-type rotary operator located on jamb at sill.
   b. Hinges: Concealed four- or six-bar friction hinges located on each jamb near top rail; two per ventilator.
   c. Lock: Lift-type throw, cam-action lock with keeper.
   d. Limit Device: Concealed friction adjustor, adjustable stay bar limit device; located on jamb of each ventilator.
3. Performance:
   a. Air Infiltration (cfm/ft.@psf): 0.10.
   b. Water Resistance (psf): 12.
   c. Uniform Load Structural/Structural Performance (psf): 70.
   d. Glazing Thickness (in.) and Type: 1 in. overall.

H. Storefront Framing System:
1. Provide storefront and entrance framing systems fabricated from extruded aluminum members of size and profile indicated.
2. Include subframes and other reinforcing members of type indicated.
3. Provide for flush glazing storefront from exterior on all sides without projecting stops.
4. Shop fabricate and preassemble frame components where possible.
5. Provide storefront frame sections without exposed seams.
6. Product: Kawneer Co. Model Trifab 450-T.

I. Insect Screens:
1. General:
   a. Provide insect screen unit for each operable exterior sash, except as otherwise indicated.
   b. Locate screen units on outside of sash or ventilator.

c. Design windows and hardware to accommodate screens in tight-fitting removable arrangement, with minimum of exposed fasteners and latches.

2. Wire Fabric - Insect: 18/16 mesh, 0.013 in. dia. coated aluminum wire, complying with FS RR-W-365, Type VII.

3. Screen Frames:
   a. Fabricate tubular-shaped extruded or formed aluminum members of min. 0.040 in. wall thickness, with mitered or coped joints and concealed mechanical fasteners.
   b. Finish frames to match window units, unless otherwise indicated.
   c. Provide removable PVC spline-anchor concealing edge of screen frame.

2.03 FABRICATION

A. General:
   1. Fabricate aluminum entrance components to designs, sizes, and thicknesses indicated and to comply with indicated standards.
   2. Sizes and profile requirements are indicated on Drawings.
   3. Variable dimensions are indicated, with maximum and minimum dimensions required, to achieve design requirements and coordination with other work.

B. Thermal-Break Construction:
   1. Fabricate framing system with integrally concealed, low-conductance thermal barrier, located between exterior materials and exposed interior members to eliminate direct metal-to-metal contact.
   2. Use manufacturer's standard construction that has been in use for similar projects for period of min. 3 years.

C. Prefabrication:
   1. Complete fabrication, assembly, finishing, hardware application, and other work to greatest extent possible before shipment to Project site.
   2. Disassemble components only as necessary for shipment and installation.
   3. Perform fabrication operations, including cutting, fitting, forming, drilling, and grinding of metal work to prevent damage to exposed finish surfaces.
   4. Complete these operations for hardware before application of finishes.

5. Do not drill and tap for surface-mounted hardware items until time of installation at Project site.
6. Preglaze door and frame units to greatest extent possible.

D. Welding:
1. Comply with AWS recommendations.
2. Grind exposed welds smooth to remove weld spatter and welding oxides.
3. Restore mechanical finish.
4. Perform welding behind finished surfaces to minimize distortion and discoloration on finished surface.

E. Reinforcing: Install reinforcing as required for hardware and as necessary for performance requirements.

F. Dissimilar Metals:
1. Separate dissimilar metals with bituminous paint or suitable sealant, or nonabsorptive plastic or elastomeric tape, or gasket between surfaces.
2. Do not use coatings containing lead.

G. Continuity:
1. Maintain accurate relation of planes and angles with hairline fit of contacting members.
2. Uniformity of Metal Finish: Abutting extruded aluminum members shall not have integral color or texture variation greater than half range indicated in sample pair submittal.

H. Fasteners: Conceal fasteners wherever possible.

I. Finishes:
1. General:
   a. Comply with NAAMM Metal Finishes Manual for recommendations relative to application and designations of finishes.
   b. Finish designations prefixed by "AA" conform to system established by Aluminum Association for designating aluminum finishes.
2. Class I Color Anodized Finish: AA-M12C22A42/A44.
   a. Mechanical Finish: As fabricated, nonspecular.
   b. Chemical Finish: Etched, medium matte.
   c. Anodic Coating: Class I Architectural, film thicker than 0.7 mil with integral color or electrolytically deposited color, complying with AAMA 606.1 or 608.1.

d. Color: As selected by Contracting Officer from manufacturer's standard color selections.

PART 3 EXECUTION

3.01 INSTALLATION

A. General:
1. Comply with manufacturer's instructions and recommendations for installation.
2. Set units plumb, level, and true to line, without warp or rack of framing members, doors, or panels.
3. Provide proper support and anchor securely in place.

B. Construction Tolerances: Install aluminum entrance to comply with following tolerances:
1. Variation from Plane: Do not exceed 1/8 in. in 12 ft. of length or 1/4 in. in any total length.
2. Offset from Alignment: Maximum offset from true alignment between two identical members abutting end to end in line shall not exceed 1/16 in.
3. Diagonal Measurements: Maximum difference in diagonal measurements shall not exceed 1/8 in.
4. Offset at Corners: Maximum out-of-plane offset of framing at corners shall not exceed 1/32 in.

C. Dissimilar Materials:
1. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
2. Zinc or cadmium plate steel anchors and other unexposed fasteners after fabrication.
3. Paint dissimilar metals where drainage from them passes over aluminum.
4. Paint aluminum surfaces in contact with mortar, concrete, or other masonry with alkali-resistant coating.
5. Paint wood and similar absorptive material in contact with aluminum and exposed to elements or otherwise subject to wetting, with two coats of aluminum house paint.
6. Seal joints between materials with sealant.

D. Fasteners:
1. Drill and tap frames and doors and apply surface-mounted hardware items, complying with hardware

manufacturer's instructions and template requirements.
2. Use concealed fasteners wherever possible.

E. Sill and Horizontal Members:
1. Set sill members and other members in bed of sealant as indicated, or with joint fillers or gaskets as indicated to provide weathertight construction.
2. Comply with requirements of Section 07901 for sealants, fillers, and gaskets.

F. Glazing: Refer to Section 08800 for installation of glass and other panels shown to be glazed into doors and framing, and not preglazed by manufacturer.

3.02 ADJUSTING AND CLEANING

A. Adjust operating hardware to function properly for smooth operation without binding, and for weathertight closure.

B. Cleaning:
1. Clean completed system, inside and out, promptly after installation, exercising care to avoid damage to coatings.
2. Clean glass surfaces after installation, complying with requirements contained in Section 08800 for cleaning and maintenance.
3. Remove excess glazing and sealants, dirt, and other substances from aluminum surfaces.

C. Protection: Institute protective measures required throughout remainder of construction period to ensure aluminum entrances will be without damage or deterioration, other than normal weathering, at time of Acceptance.

END OF SECTION

DOOR AND HARDWARE SCHEDULE

● NEW WORK

S SMOKE GASKET

ACCESSIBLE THRESHOLD NOTED FOR SADDLE ONLY. REFER TO THRESHOLD DETAILS. (FLOOR FINISH AT ALL DOORS PROVIDE FLUSH CONDITION)

DRAWING NO: **A101** **LOWER LEVEL PLAN**

DOOR								FRAME					FIRE RATING		HARDWARE - SEE SPECIFICATIONS													
								SEE "A-900" SERIES DRAWINGS							FIRE CODE					DISABLED REQUIREMENTS								
OPENING NUMBER	SHEET NUMBER	SINGLE DOOR LEAF	DOUBLE DOOR LEAF	ACTIVE LEAF	ACTIVE / INACTIVE LEAF	HEIGHT	THICKNESS	DOOR TYPE / MATERIAL - SEE DOOR ELEVATIONS	FRAME TYPE / MATERIAL - SEE FRAME ELEVATIONS	HEAD DETAIL	JAMB DETAIL	SILL / THRESHOLD DETAIL	U. L. RATING (IN MINUTES)	GASKETS and SMOKE SEALS	PANIC RELEASE HARDWARE	POSITIVE LATCHING	AUTOMATIC CLOSING	ELECT. MAG. DOOR RELEASE	DELAYED ACTION CLOSER	PUSH / PULL	LEVER HANDLE	KICKPLATE	TACTILE WARNING	ACCESSIBLE THRESHOLD	ROOM SIGN	HARDWARE SET NO.	ADDENDAS	REMARKS
101	A101	●		4'- 0"		7'- 2"		CL-5	CL-5	H-8	J-8	17/A906														902		NOTE: 01
104	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	T-2				●					●					305		
104-1	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	T-2				●					●					306		
105	A101		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	-	60	S		●					●			●		508		
106	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	-	60	S		●	●				●			●		507		
107	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	ALF-2	H-7	J-7	T-3				●					●					300		NOTE: 02, 12
108	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	ALF-2	H-7	J-7	T-3				●					●					300		NOTE: 02, 12
109	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-6	J-6	T-3				●					●					301		NOTE: 12
110	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-6	J-6	T-3				●					●					302		NOTE: 12
110-1	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-6	J-6	T-3				●					●					301		NOTE: 12
114	A101	●		3'- 0"		7'- 2"	1-3/4"	HM-1	HMF-1	H-2	J-2	T-3				●	●				●					104		NOTE: 04, 12, 13
115	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	ALF-2	H-6	J-6	T-3				●					●					602		NOTE: 02
115-1	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	ALF-2	H-6	J-6	T-3				●					●					602		NOTE: 02
116	A101		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	AL-1	ALF-1	H-9	J-9	T-1			●	●	●				●			●		001		NOTE: 03, 05, 13
116-1	A101		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	AL-1	ALF-1	H-9	J-9	T-1			●	●	●				●			●		002		NOTE: 03
117	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-2	HMF-1	H-2	J-2	-	60	S		●	●				●	●				108		NOTE: 06
118	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-2	HMF-1	H-2	J-2	T-6				●	●				●	●				102		NOTE: 06
118-1	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-2	HMF-1	H-2	J-2	T-6				●	●				●	●				102		NOTE: 06
118-2	A101		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	WD-2	HMF-1	H-2 SIM	J-2 SIM	T-7			●	●	●				●	●				205		
119	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	T-4					●		●	●		●		●		804		
120	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	T-4				●	●				●	●	●	●		506		
121	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	T-4					●		●	●		●		●		804		
122	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-3	J-3	T-4					●		●	●		●		●		803		
122-1	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	T-4					●		●	●		●		●		804		
123	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-3	J-3	T-4					●		●	●		●		●		803		
123-1	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	T-4					●		●	●		●		●		804		
124	A101		●	3'- 0"	3'-0"	7'- 2"	1-3/4"	AL-1	ALF-3	H-10	J-10	T-1 SIM			●	●	●							●		003		NOTE: 03, 08
125	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-2	HMF-1	H-2	J-2	T-2 SIM					●			●		●				802		
127	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	-	120	S		●	●				●					603		
128	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-2	HMF-1	H-2	J-2	-				●					●					303		
129	A101		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	HM-1	HMF-1	H-2	J-2	-	120	S		●	●				●					109		NOTE: 06
130	A101	●		3'- 0"		7'- 2"	1-3/4"	HM-1	HMF-1	H-3	J-3	-				●	●				●		●			504		

Drawing Print Date **2/6/2002**

Report Print Date **6/6/2002 3:49:52 PM**

DOOR AND HARDWARE SCHEDULE

● NEW WORK

S SMOKE GASKET

ACCESSIBLE THRESHOLD NOTED FOR SADDLE ONLY. REFER TO THRESHOLD DETAILS. (FLOOR FINISH AT ALL DOORS PROVIDE FLUSH CONDITION)

DOOR								FRAME					FIRE RATING		HARDWARE - SEE SPECIFICATIONS												
								SEE "A-900" SERIES DRAWINGS							FIRE CODE					DISABLED REQUIREMENTS								
OPENING NUMBER	SHEET NUMBER	SINGLE DOOR LEAF	DOUBLE DOOR LEAF	ACTIVE LEAF	ACTIVE / INACTIVE LEAF	HEIGHT	THICKNESS	DOOR TYPE / MATERIAL - SEE DOOR ELEVATIONS	FRAME TYPE / MATERIAL - SEE FRAME ELEVATIONS	HEAD DETAIL	JAMB DETAIL	SILL / THRESHOLD DETAIL	U. L. RATING (IN MINUTES)	GASKETS and SMOKE SEALS	PANIC RELEASE HARDWARE	POSITIVE LATCHING	AUTOMATIC CLOSING	ELECT. MAG. DOOR RELEASE	DELAYED ACTION CLOSER	PUSH / PULL	LEVER HANDLE	KICKPLATE	TACTILE WARNING	ACCESSIBLE THRESHOLD	ROOM SIGN	HARDWARE SET NO.	ADDENDAS	REMARKS
131	A101	●		3'- 0"		7'- 2"	1-3/4"	HM-1	HMF-1	H-3	J-3	T-4				●					●	●		●		701		
132	A101		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	HM-3	HMF-1	H-1	J-1	T-1 SIM				●	●				●			●		009		NOTE: 13, 14, LHR Active Leaf
133	A101	●		3'- 0"		7'- 2"	1-3/4"	WD-2	HMF-1	H-2	J-2	T-4 SIM				●	●				●	●		●		309		
133-1	A101	●		29'- 0"		7'- 2"		CG-1	STL	H-11	J-11	16/A906														013		NOTE: 09
133-2	A101	●		3'- 0"		7'- 2"	1-3/4"	HM-2	HMF-1	H-3	J-3	T-4 SIM				●					●			●		304		
134	A101	●		3'- 6"		4'- 0"		CG-1	STL	H-11	J-11	16/A906														013		NOTE: 09
135	A101	●		3'- 0"		7'- 2"	1-3/4"	HM-2	HMF-1	H-3	J-3	-				●					●		●			501		
A-1	A101	●		3'- 0"		7'- 2"	1-3/4"	HM-3	HMF-1	H-1	J-1	T-1 SIM			●	●	●				●			●		004		NOTE: 07, 13
A-2	A101	●		3'- 0"		7'- 2"	1-3/4"	HM-1	HMF-1	H-2	J-2	T-3	60	S		●	●				●					105		NOTE: 04, 12, 13
DRAWING NO: **A102**								**UPPER LEVEL PLAN**																				
201	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-3	J-3	-				●					●					303		
202	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-3	J-3	-				●					●					303		
203	A102	●		3'- 0"		7'- 2"	1-3/4"	HM-2	HMF-1	H-2	J-2	-				●					●					303		
204	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-6	J-6	T-2				●	●				●	●				106		NOTE: 06
204-1	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-6	J-6	T-2				●	●				●	●				106		NOTE: 06
206	A102		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	HM-2	HMF-1	H-2	J-2	T-5				●					●					601		
206-1	A102		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	HM-2	HMF-1	H-2	J-2	T-5				●					●					601		
206-2	A102	●		10'- 0"		12'- 0"		SD-1	STL	4/A303	7-A401	4/A303														013		NOTE: 09
207	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-6	J-6	T-2				●	●				●	●				106		NOTE: 06
208	A102	●		3'- 0"		7'- 2"	1-3/4"	HM-3	HMF-1	H-1	J-1	T-1 SIM				●	●				●			●		007		NOTE: 07
208-1	A102	●		3'- 0"		7'- 2"	1-3/4"	HM-2	HMF-1	H-2	J-2	-				●					●					303		
209	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-6	J-6	T-2				●	●				●	●				101		NOTE: 07, 14
211	A102	●		3'- 0"		7'- 2"	1-3/4"	HM-2	HMF-1	H-2	J-2	T-5				●					●					303		
211-1	A102		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	HM-2	HMF-1	H-2	J-2	T-5				●					●					601		
211-2	A102	●		10'- 0"		12'- 0"		SD-1	STL	4/A303	7/A401	4/A303														013		NOTE: 09
212	A102	●		3'- 6"		7'- 2"	1-3/4"	WD-2	HMF-1	H-3	J-3	-				●	●				●	●				308		
213	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-3	J-3	T-4 SIM				●					●	●		●		702		
214	A102	●		3'- 0"		7'- 2"	1-3/4"	HM-3	HMF-1	H-1	J-1	T-1 SIM				●	●				●			●		007		NOTE: 07
214-1	A102	●		3'- 0"		7'- 2"	1-3/4"	HM-2	HMF-1	H-2	J-2	-				●					●					303		
215	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-2	HMF-1	H-3	J-3	T-2				●	●				●	●				403		NOTE: 12
216	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-2	HMF-1	H-3	J-3	T-2				●	●				●	●				403		NOTE: 12
217	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-3	J-3	-	60	S		●	●				●		●			507		
218	A102		●	2'- 6"	2'- 6"	9'- 0"	1-3/4"	WD-1	WD	10/A601	11/A601	-														901		NOTE: 11

Drawing Print Date **2/6/2002**

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103rd AIR CONTROL SQUADRON

08710-DS

DOOR AND HARDWARE SCHEDULE

● NEW WORK

S SMOKE GASKET

ACCESSIBLE THRESHOLD NOTED FOR SADDLE ONLY. REFER TO THRESHOLD DETAILS. (FLOOR FINISH AT ALL DOORS PROVIDE FLUSH CONDITION)

DOOR								FRAME				FIRE RATING		HARDWARE - SEE SPECIFICATIONS												
							SEE "A-900" SERIES DRAWINGS							FIRE CODE				DISABLED REQUIREMENTS								
OPENING NUMBER	SHEET NUMBER	SINGLE DOOR LEAF	DOUBLE DOOR LEAF	ACTIVE LEAF	ACTIVE / INACTIVE LEAF	HEIGHT	THICKNESS	DOOR TYPE / MATERIAL - SEE DOOR ELEVATIONS	FRAME TYPE / MATERIAL - SEE FRAME ELEVATIONS	HEAD DETAIL	JAMB DETAIL	SILL / THRESHOLD DETAIL	U.L. RATING (IN MINUTES)	GASKETS and SMOKE SEALS	PANIC RELEASE HARDWARE	POSITIVE LATCHING	AUTOMATIC CLOSING	ELECT. MAG. DOOR RELEASE	DELAYED ACTION CLOSER	PUSH / PULL	LEVER HANDLE	KICKPLATE	TACTILE WARNING	ACCESSIBLE THRESHOLD	ROOM SIGN	HARDWARE SET NO.	ADDENDAS
219	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-3	J-3	-	60	S		●	●				●		●			507	
220	A102		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	HM-2	HMF-1	H-2	J-2	T-5				●					●					601	
220-1	A102		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	HM-2	HMF-1	H-2	J-2	T-5				●					●					601	
220-2	A102	●		10'- 0"		12'- 0"		SD-1	STL	4/A303	7-A401	4/A303														013	NOTE: 09
221	A102	●		3'- 0"		7'- 2"	1-3/4"	HM-2	HMF-1	H-2	J-2	-				●					●					303	
222	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-3	J-3	T-7					●			●		●				801	
224	A102		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	HM-3	HMF-1	H-1	J-1	T-1			●	●	●				●			●		006	NOTE: 05, 13
224-1	A102		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	HM-2	HMF-1	H-2	J-2	T-1 SIM			●	●	●				●			●		204	
225	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	T-4					●		●	●		●		●		804	
226	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	T-4				●	●				●	●	●	●		506	
227	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	T-4					●		●	●		●		●		804	
228	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-2	HMF-1	H-3	J-3	T-2				●	●				●	●				402	NOTE: 12
229	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	ALF-2	H-7	J-7	-				●	●				●	●				401	NOTE: 02, 12
230	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-3	J-3	T-4 SIM					●		●	●		●		●		803	
230-1	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	T-4 SIM					●		●	●		●		●		804	
231	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-3	J-3	T-4 SIM					●		●	●		●		●		803	
231-1	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	T-4 SIM					●		●	●		●		●		804	
233	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	-	60	S		●	●				●	●				604	
234	A102	●		3'- 0"		7'- 2"	1-3/4"	HM-3	HMF-1	H-1	J-1	T-1			●	●	●				●	●		●		004	NOTE: 07, 13
234-1	A102	●		3'- 0"		7'- 2"	1-3/4"	HM-2	HMF-1	H-2	J-2	T-1 SIM			●	●	●				●	●		●		202	
235	A102	●		3'- 0"		7'- 2"	1-3/4"	HM-3	HMF-1	H-2	J-2	T-5	60	S	●	●	●				●					103	NOTE: 07, 13
236	A102		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	HM-2	HMF-1	H-2 SIM	J-2 SIM	-				●	●				●					310	
236-1	A102	●		8'- 0"		8'- 0"		SD-2	STL	4/A303	7/A401	4/A303														013	NOTE: 10
237	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-2	HMF-1	H-3	J-3	T-2				●	●				●	●				403	NOTE: 12
238	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-2	HMF-1	H-3	J-3	T-2				●	●				●	●				403	NOTE: 12
239	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-3	J-3	-				●					●		●			502	
240	A102		●	2'- 6"	2'- 6"	9'- 0"	1-3/4"	WD-1	WD	10/A601	11/A601	-														901	NOTE: 11
241	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-3	J-3	-				●	●				●		●			505	
243	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-3	HMF-1	H-2	J-2	T-5				●	●				●	●				107	NOTE: 06
244	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-2	J-2	T-5				●					●		●			502	
245	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-3	HMF-1	H-2	J-2	T-5				●	●				●	●				107	NOTE: 06
247	A102		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	HM-2	HMF-1	H-2 SIM	J-2 SIM	-				●	●				●					310	
248	A102	●		3'- 0"		7'- 2"	1-3/4"	WD-2	HMF-1	H-3	J-3	T-2				●					●					303	
249	A102		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	HM-1	HMF-1	H-1	J-1	T-1 SIM				●					●			●		008	

DOOR AND HARDWARE SCHEDULE

● NEW WORK

S SMOKE GASKET

ACCESSIBLE THRESHOLD NOTED FOR SADDLE ONLY. REFER TO THRESHOLD DETAILS. (FLOOR FINISH AT ALL DOORS PROVIDE FLUSH CONDITION)

DOOR								FRAME					FIRE RATING		HARDWARE - SEE SPECIFICATIONS												
								SEE "A-900" SERIES DRAWINGS							FIRE CODE					DISABLED REQUIREMENTS								
OPENING NUMBER	SHEET NUMBER	SINGLE DOOR LEAF	DOUBLE DOOR LEAF	ACTIVE LEAF	ACTIVE / INACTIVE LEAF	HEIGHT	THICKNESS	DOOR TYPE / MATERIAL - SEE DOOR ELEVATIONS	FRAME TYPE / MATERIAL - SEE FRAME ELEVATIONS	HEAD DETAIL	JAMB DETAIL	SILL / THRESHOLD DETAIL	U. L. RATING (IN MINUTES)	GASKETS and SMOKE SEALS	PANIC RELEASE HARDWARE	POSITIVE LATCHING	AUTOMATIC CLOSING	ELECT. MAG. DOOR RELEASE	DELAYED ACTION CLOSER	PUSH / PULL	LEVER HANDLE	KICKPLATE	TACTILE WARNING	ACCESSIBLE THRESHOLD	ROOM SIGN	HARDWARE SET NO.	ADDENDAS	
250	A102	●		3'- 0"		7'- 2"	1-3/4"	HM-1	HMF-1	H-2 SIM	J-2 SIM	-				●					●					307		
250-1	A102		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	HM-2	HMF-1	H-1	J-1	T-1 SIM				●	●				●		●	●		012		
251	A102	●		14'- 0"		14'- 0"		SD-2	STL	2/A302	7/A401	2/A302														013		NOTE: 09
252	A102	●		14'- 0"		14'- 0"		SD-1	STL	2/A302	7/A401	2/A302														013		NOTE: 09
253	A102	●		14'- 0"		14'- 0"		SD-2	STL	2/A302	7/A401	2/A302														013		NOTE: 10
254	A102	●		14'- 0"		14'- 0"		SD-1	STL	2/A302	7/A401	2/A302														013		NOTE: 10
255	A102	●		14'- 0"		14'- 0"		SD-2	STL	2/A302	7/A401	2/A302														013		NOTE: 09
256	A102	●		14'- 0"		14'- 0"		SD-1	STL	2/A302	7/A401	2/A302														013		NOTE: 09
257	A102	●		14'- 0"		14'- 0"		SD-2	STL	2/A302	7/A401	2/A302														013		NOTE: 10
258	A102	●		14'- 0"		14'- 0"		SD-1	STL	2/A302	7/A401	2/A302														013		NOTE: 10
259	A102	●		14'- 0"		14'- 0"		SD-2	STL	2/A302	7/A401	2/A302														013		NOTE: 09
259-1	A102		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	HM-3	HMF-1	H-2	J-2	T-2	60			●	●				●					311		
259-2	A102	●		3'- 0"		7'- 2"	1-3/4"	HM-1	HMF-1	H-1	J-1	T-1 SIM			●	●	●				●				●		010		
260	A102	●		14'- 0"		14'- 0"		SD-1	STL	2/A302	7/A401	2/A302														013		NOTE: 09
261	A102	●		3'- 0"		7'- 2"	1-3/4"	HM-3	HMF-1	H-1	J-1	T-1 SIM			●	●	●				●				●		005		NOTE: 07, 13
261-1	A102	●		3'- 0"		7'- 2"	1-3/4"	HM-2	HMF-1	H-3	J-3	T-1			●	●	●				●	●					201		
A-3	A102	●		3'- 0"		7'- 2"	1-3/4"	HM-3	HMF-1	H-2	J-2	T-2			●	●	●				●	●					203		
A-4	A102	●		3'- 0"		7'- 2"	1-3/4"	HM-3	HMF-1	H-1	J-1	T-1 SIM			●	●	●				●				●		005		NOTE: 07, 13
DRAWING NO: **A103** **MEZZANINE / ATTIC LEVEL PLAN**																												REMARKS
M-1	A103	●		3'- 0"		7'- 2"	1-3/4"	HM-1	HMF-1	H-12	J-12	-				●	●				●		●			503		
M-3	A103		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	HM-2	HMF-1	H-2 SIM	J-12 SIM	-				●	●				●		●			509		
DRAWING NO: **A801** **MOBILITY WAREHOUSE**																												REMARKS
W01	A801	●		3'- 0"		7'- 2"	1-3/4"	WD-1	HMF-1	H-3	J-3	T-7				●					●	●		●		702		
W03	A801	●		3'- 0"		7'- 2"	1-3/4"	HM-3	HMF-1	H-13	J-13	T-1 SIM				●	●				●			●		007		NOTE: 07
W03-1	A801	●		3'- 0"		7'- 2"	1-3/4"	HM-2	HMF-1	H-3	J-3	T-5				●					●					303		
W04	A801	●		12'- 0"		12'- 0"		SD-1	STL	A/A801	-	A/A801														013		NOTE: 09
DRAWING NO: **A803** **ELEVATED TOWER PAD**																												REMARKS
RP-1	A803		●	3'- 0"	3'- 0"	7'- 2"	1-3/4"	HM-3	HMF-1	H-2 SIM	J-2 SIM	T-1 SIM				●					●		●	●		011		

DOOR AND HARDWARE SCHEDULE

DOOR								FRAME					FIRE RATING		HARDWARE - SEE SPECIFICATIONS											
								SEE "A-900" SERIES DRAWINGS							FIRE CODE					DISABLED REQUIREMENTS						
OPENING NUMBER	SHEET NUMBER	SINGLE DOOR LEAF	DOUBLE DOOR LEAF	ACTIVE LEAF	ACTIVE / INACTIVE LEAF	HEIGHT	THICKNESS	DOOR TYPE / MATERIAL - SEE DOOR ELEVATIONS	FRAME TYPE / MATERIAL - SEE FRAME ELEVATIONS	HEAD DETAIL	JAMB DETAIL	SILL / THRESHOLD DETAIL	U.L. RATING (IN MINUTES)	GASKETS and SMOKE SEALS	PANIC RELEASE HARDWARE	POSITIVE LATCHING	AUTOMATIC CLOSING	ELECT. MAG. DOOR RELEASE	DELAYED ACTION CLOSER	PUSH / PULL	LEVER HANDLE	KICKPLATE	TACTILE WARNING	ACCESSIBLE THRESHOLD	ROOM SIGN	HARDWARE SET NO.	ADDENDAS

● NEW WORK

S SMOKE GASKET

ACCESSIBLE THRESHOLD NOTED FOR SADDLE ONLY. REFER TO THRESHOLD DETAILS. (FLOOR FINISH AT ALL DOORS PROVIDE FLUSH CONDITION)

General Hardware Remarks / Notes and Comments

NOTE	01	VAULT DOOR & HARDWARE BY "A.N.G.", to be Installed by "General Contractor"
NOTE	02	"V" WALL SYSTEM W/ WOOD TRANSOM
NOTE	03	"Aluminum Door Hardware" - All door hardware with the exception of "Weatherstripping, Door Bottoms, and Meeting Styles" shall be supplied by "SECTION 08710" (NO EXCEPTIONS). Aluminum Door Hardware shall be furnished to the Aluminum Door Supplier for his installation prior to delivery of Aluminum Doors to project. "Weatherstripping, Door Bottoms, and Meeting Styles" shall be supplied and installed by the Aluminum Door Supplier.
NOTE	04	AVS-ACCESS CONTROL - "BIO READER" x STOREROOMROOM LOCK, READ IN - READ OUT.
NOTE	05	Section 08710 - ACCESS CONTROL - "ELECTRIC LATCH RETRACTION" on Panic Release Hardware @ RHR Leaf Only, LHR ot EXIT ONLY. Power Supply by Section 08710
NOTE	06	Section 08710 - LOCKNETICS MODEL - (Stand Alone Lock)
NOTE	07	Section 08710 - ACCESS CONTROL - "ELECTRIC LATCH RETRACTION" on Panic Release Hardware. Power Supply by Section 08710
NOTE	08	EXIT ONLY, NO EXTERIOR TRIM
NOTE	09	INSULATED OVERHEAD SECTIONAL DOOR
NOTE	10	INSULATED OVERHEAD SECTIONAL DOORW/ INTERGRAL PERSONNEL DOOR (SR FUNCTION), DOOR CONTACTS are Required.
NOTE	11	HARDWARE BY MILLWORK SUPPLIER
NOTE	12	SOUND GASKETTED DOOR
NOTE	13	DOOR CONTACTS IN "DOOR" & "FRAME"
NOTE	14	Section 08710 - ACCESS CONTROL - "ELECTRIC LATCH RETRACTION" on Storeroom Function Mortise Lock. Power Supply by Section 08710

SECTION 08800

GLAZING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: Work of this Section consists of installing all materials furnished under this Section, including all equipment, labor, services, and incidental items required to complete work as shown on Drawings and specified in this Section.
   1. Clear tempered laminated safety glass with speaker port set in aluminum channel frames (provided by Section 05500) mounted in Security Desk (provided by Section 06200).
   2. Clear float glass and tempered safety glass for standard steel frames (provided by Section 08111).
   3. Tempered safety glass with double-tint for vestibules, doors, and sidelights and insulated float glass with double-tint for field-glazed fixed windows (provided by Section 08410).
   4. Insulated float glass with double-tint requirements for factory-glazed hopper windows (provided by Section 08410).
   5. Ceramic-coated (opaque) insulating spandrel glass.
   6. Mirror glass for unframed wall mirrors.

B. Related Sections:
   1. 05500, Metal Fabrications; for aluminum channel frames at Security Desk.
   2. 08111, Standard Steel Doors and Frames; for completion of framing erection before beginning field-glazing.
   3. 08410, Aluminum Entrances and Windows; for completion of framing erection before beginning field-glazing.

C. Work Not Included as Work of This Section:
   1. 08211, Flush Wood Doors; for factory-glazed wood doors.

2. 08410, Aluminum Entrances and Windows; for factory-glazed awning windows.

1.03 SYSTEM DESCRIPTION

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to following.
   1. Defective manufacture, fabrication, and installation.
   2. Failure of sealants or gaskets to remain watertight and airtight.
   3. Deterioration of glazing materials or other construction defects.

B. Glass Design:
   1. General:
      a. Glass thicknesses indicated are minimums and are for detailing only.
      b. Confirm glass thicknesses by analyzing Project loads and in-service conditions.
      c. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed following criteria.
   2. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E1300 and according to following requirements.
      a. Specified Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour (mph) at 33 ft. above grade, according to ASCE 7, Minimum Design Loads for Buildings and Other Structures: Section 6.4.2, Analytic Procedure, based on mean roof heights above grade indicated on Drawings.
      b. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or max. 15 deg. off vertical and under wind action for max. 60 second load duration.
      c. Maximum Lateral Deflection: For glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times short side length or 1 in. for monolithic-glass lites heat-treated to resist wind loads, insulating glass, or laminated-glass lites.

d. Minimum Glass Thickness for Exterior Lites: Min. 6 mm.

C. Thermal Movements:
1. General:
a. Provide glazing that allows for thermal movements resulting from following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components.
b. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
2. Temperature Change (Range): 120 deg. F (67 deg. C), ambient; 180 deg. F (100 deg. C), material surfaces.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below.
1. Monolithic-Glass Lites: Properties are based on units with lites 6 mm thick.
2. Insulating-Glass Units: Properties are based on units with lites 6 mm thick and nominal 1/2 in. wide interspace.
3. Center-of-Glass U-Values: NFRC 100 methodology using LBL-35298 WINDOW 4.1 computer program, expressed as Btu/sq. ft. x H x deg. F (W/sq. m x K).
4. Center-of-Glass Solar Heat Gain Coefficient: NFRC 200 methodology using LBL-35298 WINDOW 4.1 computer program.
5. Solar Optical Properties: NFRC 300.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each glazing material and fabricated glass product required, including installation and maintenance instructions.

1.05 QUALITY ASSURANCE

A. Reference Standards:
1. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1; subject to compliance with requirements, permanently-mark safety glass with certification

label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.

2. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of following inspecting and testing agency:
   a. Insulating Glass Certification Council.
   b. Associated Laboratories, Inc.
   c. National Accreditation and Management Institute.

B. Single Source Responsibility: Provide materials obtained from one source for each type of glass and glazing product indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect glass and glazing materials during delivery, storage, and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.

B. Where insulating glass units will be exposed to substantial altitude changes, avoid hermetic seal ruptures by complying with insulating glass fabricator's recommendations for venting and sealing.

1.07 PROJECT/SITE CONDITIONS

A. Environmental Conditions:
   1. Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation, or other cause.
   2. Install glazing sealants only when temperatures are in middle third of manufacturer's recommended installation temperature range.
   3. Install liquid sealants at ambient and substrate temperatures above 40 deg. F(4.4 deg. C).

1.08 WARRANTY

A. Manufacturer's Special Project Warranty on Insulating Glass:
   1. Provide written warranty signed by manufacturer of insulating glass agreeing to furnish FOB point of manufacture, freight allowed Project site, within specified warranty period indicated below, replacements for those insulating glass units developing manufacturing defects.
   2. Manufacturing defects are defined as failure of hermetic seal of air space (beyond that due to glass breakage) as evidenced by intrusion of dirt or moisture, internal condensation or fogging, deterioration of protected internal glass coatings, if any, and other visual indications of seal failure or performance; provided manufacturer's instructions for handling, installing, protecting, and maintaining units have been complied with during warranty period.
   3. Warranty Period: Manufacturer's standard min. 10 years after date of Substantial Completion.

B. Manufacturer's Special Warranty on Laminated Glass:
   1. Provide written warranty signed by manufacturer of laminated glass agreeing to furnish FOB point of manufacture, freight allowed Project site, within specified warranty period indicated below, laminated glass units that develop manufacturing defects.
   2. Manufacturing defects are defined as edge separation or delamination that materially obstructs vision through glass.
   3. Warranty Period: Manufacturer's standard min. 4 years after date of Substantial Completion.

C. These warranties shall be in addition to and not limitation of other rights Government may have against Contractor under Contract Documents.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Clear and Tinted Float Glass: Guardian Industries Corp., Libbey-Owens-Ford Co., PPG Industries Inc.

B. Figured/Pattern Glass: AFG Industries Inc., Guardian Industries Corp., Hordis Brothers Inc.

C. Heat-Treated Glass: Falconer Glass Industries, Guardian Industries Corp., Hordis Brothers Inc., LOF Glass Inc., PPG Industries Inc.

D. Insulating Glass: Falconer Glass Industries, Guardian Industries Corp., Hordis Brothers Inc., PPG Industries Inc.

E. Laminated Glass: Falconer Glass Industries, Guardian Industries Corp., Hordis Brothers Inc., PPG Industries Inc.

2.02 MATERIALS

A. General:
1. Primary Glass Standard: Provide primary glass that complies with ASTM C1036 requirements, including those indicated by reference to type, class, quality, and form.
2. Heat-Treated Glass Standard: Provide heat-treated glass that complies with ASTM C1048 requirements, including those indicated by reference to Grade, Style, Type, Quality, and Class.
3. Sizes:
a. Fabricate glass to sizes required for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer.
b. Provide thicknesses indicated or, if not otherwise indicated, as recommended by glass manufacturer for application indicated.

B. Primary Glass Products:
1. Clear Float Glass: Type I, Class 1 (transparent), Quality q3 (glazing select).
2. Double-Tinted Float Glass:
a. Type I, Class 2 (heat absorbing and light reducing), Quality q3 (glazing select).
b. Color - Bronze: Manufacturer's standard tint, with visible light transmittance of 50 to 52 percent and shading coefficient of 0.69 to 0.71 for 1/4 in. thick glass.
c. Refer to coated glass product requirements for tint and performance characteristics of coated tinted glass for single glazing relative to visible light transmittance, U-values, shading coefficient, and visible reflectance.
d. Refer to requirements for sealed insulating glass units for performance characteristics of

assembled units composed of tinted glass, coated or uncoated, relative to visible light transmittance, U-values, shading coefficient, and visible reflectance.

3. Patterned Glass:
   a. Pattern p3 (random), Class 1 (translucent): AFG Industries Inc. Model Smooth Rough, Guardian Industries Corp.
4. Wire Glass: Type II (rolled), class 1 (transparent), quality q8 (glazing), Form 1 (wired, polished both sides), mesh m2 (square); complying with ANSI Z97.1; 1/4 in. thick.

C. Heat-Treated Glass:
   1. Manufacturing Process: Horizontal (roller hearth) process with roll wave distortion parallel with bottom edge of glass as installed, unless otherwise indicated.
   2. Clear Tempered Float Glass: Grade B (fully tempered), Style I (uncoated surfaces), Type I (float), Quality q3 (glazing quality), Class 1 (transparent).

D. Sealed Insulating Glass Units:
   1. General: Provide preassembled units consisting of organically sealed panes of glass enclosing hermetically sealed dehydrated air space and complying with ASTM E774 for performance classification indicated and with other requirements specified for glass characteristics, air space, sealing system, sealant, spacer material, corner design, and desiccant.
      a. Properties of Individual Glass Panes Making up Units: Refer to product requirements specified elsewhere in this Section applicable to types, classes, kinds, and conditions of glass products indicated.
      b. Provide heat-treated panes of kind and at locations indicated or, if not indicated, provide heat-strengthened panes where recommended by manufacturer for application indicated and tempered where indicated or where safety glass is designated or required.
      c. Performance Characteristics: Nominal values based on manufacturer's published test data for units with 1/4 in. thick glass panes and 1/2 in. thick air space.

d. U-values indicated are expressed in number of Btu's per hour per sq. ft. per deg. F difference.
e. Performance Classification per ASTM E774: Class A.
f. Thickness of Each Pane: 1/4 in.
g. Air Space Thickness: 1/2 in.
h. Sealing System: Manufacturer's standard.
i. Spacer Material: Manufacturer's standard metal.
j. Desiccant: Manufacturer's standard; either molecular sieve or silica gel or blend of both.
k. Corner Construction: Manufacturer's standard.

2. Low-Emissivity-Coated Insulating Glass Units:
a. Manufacturer's standard units with one pane of glass coated with durable, neutral-colored, low-emissivity metallic coating, of type and on surface indicated, and complying with following requirements.
b. Exterior Pane: Clear float glass, coated on second surface.
c. Interior Pane: Clear float glass, uncoated.

3. Insulating Spandrel Glass:
a. Manufacturer's standard units with Kind HS (heat strengthened) exterior pane and location of reflective coating matching coated insulating glass units for type, class, and coating characteristics, and with interior pane complying with following additional requirements.
b. Ceramic-Coated Heat-Treated Spandrel Glass: Condition B (spandrel glass, one surface ceramic coated), Kind HS (heat strengthened), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select).
c. Color: Match tinted glass color.
d. Location of Ceramic Coating: Third surface of insulating spandrel unit.

E. Laminated Glass:
1. General: Refer to primary and heat-treated glass requirements relating to properties of uncoated glasses making up laminate glass products.
2. Plastic Interlayer:
a. Provide glass fabricator's standard polyvinylbutyl interlayer for laminating panes of glass, with proven record of showing no tendency to bubble, discolor, or lose physical or mechanical properties after laminating and

installation, in clear or colors and of thickness indicated.
b. Product: Monsanto Co. Model Saflex.
3. Laminating Process: Fabricate laminated glass using laminator's standard heat-plus-pressure process to produce glass free from foreign substances and air/glass pockets.
4. Laminate Safety Glass:
a. Two panes of glass of equal thickness, laminated together with 0.030 in. thick plastic interlayer.
b. Glass Characteristics: Float glass.
c. Class: I (transparent).
d. Grade: B (fully tempered).
e. Thickness: 1 in.
f. Color of Plastic Interlayer: Clear.

F. Glazing Sealants:
1. General:
a. Comply with recommendations of sealant and glass manufacturers for selection of glazing sealants that have performance characteristics suitable for applications indicated and conditions at time of installation.
b. Compatibility: Select sealants with proven compatibility with surfaces contacted in installation and under service conditions indicated, as demonstrated by testing and field experience.
c. Colors: Provide color of exposed sealants indicated or, if not otherwise indicated, as selected by Contracting Officer from manufacturer's standard colors.
2. One-Part Nonacid Curing Silicone Glazing Sealant: Type S, Grade NS, Class 25, Uses NT, G, A, and, as applicable to uses indicated, O; and complying with following requirements of modulus and additional joint movement capability.
a. Medium Modulus: Tensile strength of min. 45, max. 75 psi at 100 percent elongation when tested per ASTM D412 after 14 days at 77 deg. F(20 deg. C) and 50 percent relative humidity.
b. Additional capability, when tested per ASTM C719 for adhesion and cohesion under maximum cyclic movement, to withstand following percentage increase and decrease of joint width, as measured at time of application, and remain in compliance with other requirements of ASTM C920; 50 percent.

G. Miscellaneous Glazing Materials:
1. General:
a. Compatibility: Provide materials with proven record of compatibility with surfaces contacted in installation.
b. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.
2. Setting Blocks: Neoprene, EPDM, or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.
3. Spacers: Neoprene, EPDM, or silicone blocks, or continuous extrusions as required for compatibility with glazing sealant, of size, shape, and hardness recommended by glass and sealant manufacturers for application indicated.
4. Edge Blocks: Neoprene, EPDM, or silicone blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement (side-walking) of glass.
5. Compressible Filler Rods: Closed-cell or waterproof-jacketed rod stock of synthetic rubber or plastic foam, flexible and resilient, with 5-10 psi compression strength for 25 percent deflection.

H. Mirror:
1. Plate glass, electroplated, painted and baked for corrosion resistance.
2. Thickness: 1/4 in.
3. Color: Clear.
4. Edge Treatment: Eased smooth.

PART 3 EXECUTION

3.01 INSTALLATION

A. General:
1. Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.
2. Glazing Channel Dimensions:
a. As indicated in details, intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
b. Adjust as required by job conditions at time of installation.

3. Protect glass from edge damage during handling and installation.
4. Use rolling block in rotating glass units to prevent damage to glass corners.
5. Do not impact glass with metal framing.
6. Use suction cups to shift glass within openings.
7. Do not raise or drift glass with pry bar.
8. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so these are located at top of opening.
9. Remove from Project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.

B. Glazing:
1. Install setting blocks of proper size in sill rabbet, located one quarter of glass width from each corner, but no closer than 6 in., unless otherwise required.
2. Set blocks in thin course of sealant which is acceptable for heel bead use.
3. Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches, except where gaskets or glazing tapes with continuous spacer rods are used for glazing.
4. Provide min. 1/8 in. bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
5. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.
6. Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.
7. Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back surface and to control depth of sealant for optimum performance, unless otherwise indicated.
8. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
9. Tool exposed surfaces of sealants to provide substantial wash way from glass.

C. Wall Mirrors:
1. Install spots of adhesive, 4 spots per sq. ft., approximately 1/8 in. to 3/16 in. thick and 4 in. to 4-1/2 in. in dia.
2. Provide bottom support for mirrors min. 3 days until adhesive has set.
3. Install bedding tape or cushion strip under bottom edge of each mirror.
4. Tolerances:
a. Offset in Alignment of Adjoining Edges: Max. 1/16 in.
b. Offset in Face Alignment Over Wall Surface: Max. 1/8 in.
c. No gap between adjacent members.

3.02 PROTECTION AND CLEANING

A. Protection:
1. Protect exterior glass from breakage immediately on installation by use of crossed streamers attached to framing and held away from glass.
2. Do not apply markers to surfaces of glass.
3. Remove nonpermanent labels and clean surfaces.
4. Protect glass from contact with contaminating substances resulting from construction operations.
5. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.

B. Cleaning and Damaged Glass Replacement:
1. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, min. once monthly, for build-up of dirt, scum, alkali deposits, or staining.
2. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.
3. Remove and replace glass which is broken, chipped, cracked, abraded, or damaged in other ways during construction period, including natural causes, accidents, and vandalism.
4. Wash glass on both faces max. 4 days before date scheduled for inspections intended to establish date of Substantial Completion in each area of Project.

5. Wash glass by method recommended by glass manufacturer.

END OF SECTION

SECTION 09255

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: Work of this Section consists of installing all materials furnished under this Section, including all equipment, labor, services, and incidental items required to complete work as shown on Drawings and specified in this Section.
   1. Steel framing members to receive gypsum board for interior walls, partitions, ceilings, and soffits.
   2. Screw-attached plywood (furnished by Section 06100) to both sides of steel framing members after placement of acoustic insulation (furnished by Section 07210) between studs for security walls.
   3. Gypsum board screw-attached to steel framing and furring members for interior walls, partitions, ceilings, and soffits.
   4. Trim accessories.
   5. Gypsum board joint treatment.
   6. Miscellaneous accessories, including:
      a. Joint reinforcement materials
      b. Acoustical sealant.
      c. Laminating adhesive for multilayer construction.
      d. Steel drive screws.
      e. Isolation strips at exterior walls.

B. Related Sections:
   1. 06100, Rough Carpentry; for wood framing, furring, and blocking supporting gypsum assemblies and plywood for security walls.
   2. 07210, Building Insulation; for thermal insulation in walls, ceilings, and vapor barrier (retarder).
   3. 07841, Through-Penetration Firestop Systems; for fire-resistive penetration and joint systems in gypsum plaster assemblies.

4. 08311, Access Doors and Frames; for wall and ceiling units installed in gypsum plaster assemblies.
5. 09900, Painting; for field-applied coating applied to gypsum assemblies.

1.03 SUBMITTALS

A. Product Data: Submit product data from manufacturers for each type of product specified.

B. Shop Drawings:
1. Submit shop drawings for special components and installations not fully dimensioned or detailed in manufacturer's product data.
2. Include placing drawings for framing members showing size and gage designations, number, type, location and spacing.
3. Indicate supplemental strapping, bracing, splices, bridging accessories, and details required for proper installation.
4. Provide engineering calculations indicating actual metal thickness, profile depth, and span limits to achieve specified limit deflection for partition and wall thicknesses and spans.

1.04 QUALITY ASSURANCE

A. Design Criteria:
1. Fire-Resistance Rating:
a. Where indicated, provide materials and construction that are identical to those of assemblies whose fire-resistance rating has been determined per ASTM E119 by testing and inspecting organization acceptable to authorities having jurisdiction.
b. Provide fire-resistance-rated assemblies identical to those indicated by reference to GA File Numbers in GA Fire Resistance Design Manual or to design designations in UL Fire Resistance Directory or in listing of other testing and agencies acceptable to authorities having jurisdiction.

B. Single Source Responsibility: Obtain gypsum board products from single manufacturer or from manufacturers recommended by prime manufacturer of gypsum boards.

C. Sound Transmission Characteristics:
1. Provide materials and construction identical to those tested to ASTM E90 and classified to ASTM E413 by qualified independent testing agency.
2. STC-Rated Assemblies: 49.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Storage:
1. Store materials inside under cover and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion, and damage from construction traffic and other causes.
2. Neatly stack gypsum boards flat to prevent sagging.

C. Handling:
1. Handle gypsum boards to prevent damage to edges, ends, or surfaces.
2. Do not bend or damage metal corner beads and trim.

1.06 PROJECT CONDITIONS

A. Environmental Conditions: Establish and maintain environmental conditions for application and finishing gypsum board to comply with ASTM C840 and with gypsum board manufacturer's recommendations.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel Framing Components - Suspended and Furred Ceilings:
1. General: Comply with ASTM C754 for conditions indicated using sheet steel complying with ASTM C645.
2. Wire Hangers: ASTM A641, Class 1 zinc coating, soft temper, min. 0.162 in. dia.
3. Tie Wire: ASTM A641, Class 1 zinc coating, soft temper, 0.0625 in. dia. wire or double strand of 0.0475 in. dia. wire.
4. Channels:
a. Cold-rolled steel, min. 0.0538 in. thickness of base (uncoated) metal and 1/2 in. wide flanges, protected with rust-inhibitive paint.

b. Carrying Channels: 2 in. deep.
c. Furring Channels: 3/4 in. deep.

5. Steel Studs for Furring Channels: ASTM C645, min. 0.0179 in. thickness, min. 1-5/8 in. depth.
6. Steel Resilient Furring Channels: 1/2 in. deep members, hat-shaped, min. 0.0179 in. thick.

B. Walls, Partitions, and Soffits:
1. Steel Studs and Runners: ASTM C645.
a. Walls, Partitions, and Soffits: Min. 0.027 in. thick, depth as indicated.
b. Fire Door Frame: Min. 0.0312 in. thick, depth as indicated, except use nested 0.0179 in. thick studs as alternate at standard weight doors.
c. Ceramic Tile Substrates: Min. 0.312 in. thick, depth as indicated.
d. Engineer framing for walls and partitions to max. L/360 limit deflection of completed assembly.
2. Deep-Leg Deflection Track:
a. Provide for slip-joint at stud and top-track interface to avoid axial loading of partition for completed assembly crack control.
b. ASTM C645, top runner with 2 in. deep flanges; match stud thickness.
3. Firestop Track:
a. Top runner to allow partition heads to expand and contract with structure movement and maintain continuity of fire-resistance-rated assembly.
b. Provide thickness to match studs with width as required for depth of studs.
c. Product: Fire Trak Corp. Model FireTrak, Metal-Lite Inc. Model The System.
4. Cold-Rolled Channel Bridging for Fixture Attachment or Lateral Bracing:
a. Min. 0.0538 in. base steel thickness, min. 1/2 in. wide flange, min. 1-1/2 in. depth.
b. Clip Angle: 1-1/2 in. x 1-1/2 in., 0.068 in. thick, galvanized steel.
5. Steel Rigid Furring Channels: ASTM C645, hat-shaped, 7/8 in. deep, min. 0.312 in. thick base (uncoated) metal, unless otherwise indicated.
6. Tie Wire: ASTM C641, Class 1 zinc coating, soft temper, 0.0625 in. dia. wire or double strand of 0.0475 in. dia. wire.
7. Fasteners: Provide fasteners of type, material, size, corrosion-resistance, holding power, and

other properties required to securely fasten steel framing and furring members to substrates involved; comply with recommendations of gypsum drywall manufacturer for applications indicated.

C. Gypsum Board:
1. Regular-Type: ASTM C36, 5/8 in. thick, tapered long edges.
2. Type X: ASTM C36, 5/8 in. thick, tapered long edges.
3. Exterior Soffit Board: ASTM C931 and ASTM C1396, gypsum core soffit board with additives to enhance sag-resistance of core, 1/2 in. thick, beveled tapered edges.

D. Trim Accessories: ASTM C1047, approved by gypsum board manufacturer.
1. Type: Galvanized steel sheet.
2. Shapes:
a. Corner Bead: Use at outside corners.
b. LC-Bead (J-Bead): Use at exposed panel edges.
c. Expansion (Control) Joints:

LOCATION	PROCEDURE
Ceilings	- Install in areas exceeding 2500 sq. ft. Space max. 50 ft. o.c. - Install where ceiling framing or furring - changes direction
Partitions	- Space max. 30 ft. o.c.
Furring	- Space max. 30 ft. o.c. - Install where control joints occur in base exterior wall

E. Gypsum Board Joint Treatment Materials: Comply with ASTM C475.

F. Acoustical Sealant:
1. Nondrying, nonhardening, nonskinning, nonstaining gunnable, synthetic rubber.
2. Product: Ohio Sealants Inc. Model Pro Series SC-170, Pecora Corp. Model BA-98, Tremco Inc. Model Tremco Acoustical Sealant.

G. Miscellaneous Materials:
1. General: Provide auxiliary materials for gypsum work of type and grade recommended by gypsum board manufacturer.
2. Laminating Adhesive: Special adhesive or joint compound recommended for laminating gypsum boards.
3. Isolation Strip at Exterior Walls: Adhesive-backed, closed-cell vinyl foam strips allowing fastener penetration without foam displacement, 1/8 in. thick, width to suit steel stud size.

PART 3 EXECUTION

3.01 INSTALLATION

A. Steel Framing - General:
1. Steel Framing Installation Standard: Install steel framing to comply with ASTM C754 and C844 requirements that apply to framing installation.
2. Install supplementary framing, blocking, and bracing at terminations in gypsum board construction and for support of fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, and similar construction to comply with details indicated and recommendations of manufacturer or, if none available, with Gypsum Construction Handbook published by United States Gypsum Co.
3. Isolation:
a. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement, at locations indicated below to comply with details shown on Drawings.
b. Where edges of suspended ceiling abut building structure horizontally at ceiling perimeters or penetrations of structural elements.
c. Where partition and wall framing abuts overhead structure.
4. Do not bridge building expansion and control joints with steel framing or furring members; independently frame both sides of joints with framing or furring members or as indicated.

B. Steel Suspended Ceiling and Soffit Framing:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or ceiling suspension system.

2. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other effective means.
3. Install supplemental suspension members and hangers in form of trapezes to eliminate interference with ducts or other construction.
4. Size supplemental members and hangers to support ceiling loads.
5. Installation Tolerances: Install steel framing components for suspended ceiling so cross-furring members are level to within 1/8 in. in 12 ft. as measured lengthwise on each member and transversely between parallel members.
6. Wire-tie or clip furring members to main runners and to other structural supports as indicated.
7. Install suspended components in sizes and spacing to limit deflection to L/240 with hangers and main runners max. 48 in. o.c., and furring members max. 16 in. o.c.

C. Steel Wall and Partition Framing:
1. Install runner (tracks) at floors, ceiling, and structural walls and columns where veneer plaster stud system abuts other construction.
2. Where studs are installed directly against exterior walls, install foam gasket strips between studs and wall.
3. Installation Tolerances: Install each steel framing and furring member so fastening surfaces do not vary more than 1/8 in. from plane of faces of adjacent framing.
4. Extend partition framing full-height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings.
5. Continue framing over frames for doors and openings, and frame around ducts penetrating partitions above ceiling to provide support for gypsum base.
6. Terminate partition framing at suspended ceiling where indicated.
7. Steel Studs and Furring:
   a. Install in sizes and at spacing indicated, but not less than that required by referenced steel framing installation standard.
   b. Install steel studs so flange point in same direction and gypsum base can be installed in direction opposite to that of flange.

8. Door Openings:
   a. Frame door openings to comply with details indicated or, if none indicated, in same manner as required for door openings.
   b. Attach vertical studs at jambs with screws directly to frames or to jamb anchor clips on door frames.
   c. Install runner track section (for cripple studs) at head and secure to jamb studs.
   d. Extend vertical jamb studs through suspended ceilings, attach to underside of floor or roof structure above.
9. Openings Other Than Door Openings:
   a. Frame to comply with details indicated or, if not indicated, in same manner as required for door openings.
   b. Install framing below sills of openings to match framing required above door heads.

D. Gypsum Board Application and Finishing - General Requirements:
1. Gypsum Board Application and Finishing Standards: ASTM C840.
2. Install sound attenuation blankets as indicated before gypsum board, unless readily-installed after board has been installed.
3. Locate exposed endbutt joints as far from center of walls and ceilings as possible and stagger min. 24 in. in alternate courses of board.
4. Ceiling Boards:
   a. Install ceiling boards across framing to minimize number of end-butt joints and avoid end joints in central area of each ceiling.
   b. Stagger end joints min. 24 in.
5. Attach gypsum board to steel studs so leading edge or end of each board is attached to open (unsupported) edge of stud flange first.
6. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.
7. Hollow Metal Door Frames:
   a. Spot-grout hollow metal door frames for solid-core wood doors, hollow-metal doors, and doors over 32 in. wide.
   b. Apply spot-grout at each jamb anchor clip just before inserting board into frame.
8. Sound-Rated Drywall:
   a. Where sound-rated drywall work is indicated, including double-layer work and work on

resilient furring, seal work at perimeters, control and expansion joints, openings, and penetrations with continuous bead of acoustical sealant, including bead at both faces of partitions.

b. Comply with ASTM C919 and manufacturer's recommendations for location of beads, and close off sound-flanking paths around or through work, including sealing of partitions above acoustical ceilings.

c. Double-Layer Partition Systems: Work above acoustical ceilings may be installed with base layer only.

9. Space fasteners in gypsum boards in accordance with referenced standards and manufacturer's recommendations, except as otherwise indicated.

E. Drywall Trim Accessories: Where feasible, use same fasteners to anchor trim accessory flanges as required to fasten gypsum board to supports or fasten flanges to comply with manufacturer's recommendations.

F. Drywall Finishing:

1. General:
   a. Treat joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.
   b. Remove residual joint compound from adjacent surfaces as work progresses.
   c. Prefill open joints and damaged surface areas.
   d. Apply tape over joints, except at trim having flanges not intended for tape.
2. Ridging and Beading:
   a. If ridging or beading at joints is visible with strong low-angle lighting (side lighting), lightly sand ridge down, taking care not to damage embedded joint reinforcing tape.
   b. Fill surface over joint with taping compound as wide as necessary to create essentially plane surface.
   c. After 24 hours of drying, lightly sand, as required, to feather edges and remove trowel marks.
   d. If examination of joint with strong low-angle lighting reveals ridge is not concealed, apply additional feathering coats of joint compound until joint is acceptable to Contracting Officer.

e. If ridging or beading is still visible after feathering, apply skim coat of joint compound over entire surface to eliminate effect of ridging or beading.

3. Gypsum Board Finish Levels: Finish gypsum board to levels indicated according to ASTM C840.
   a. Level 1: Embed tape at joints in ceiling plenum areas and concealed areas, unless higher level finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
   b. Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for tile (provided by Section 09300).
   c. Level 3: Embed tape and apply separate first and fill coats of joint compound to tape, fasteners, and trim flanges for surfaces receiving medium- or heavy-texture finishes before painting where lighting conditions are not critical.
   d. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim at panel surfaces exposed-to-view and receiving flat or eggshell paint or wallcovering.
   e. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface for surfaces receiving gloss and semigloss paint.

END OF SECTION

SECTION 09300

TILE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: Work of this Section consists of installing all materials furnished under this Section, including all equipment, labor, services, and incidental items required to complete work as shown on Drawings and specified in this Section.
   1. Tile to Include:
      a. Ceramic mosaic.
      b. Glazed wall.
   2. Tile Trim Accessories to Include:
      a. Glazed bullnose.
      b. Ceramic mosaic bullnose.

B. Related Sections:
   1. 03300, Cast-In-Place Concrete; for trowel finish texture.
   2. 07901, Joint Sealants; for sealing perimeter of tile to adjacent surfaces and materials.

1.03 SUBMITTALS

A. Samples for Verification Purposes: Submit for each item listed below, with prepared samples of size and construction indicated, products involving color and texture variations, in sets showing full-range of variations expected.
   1. Each type and composition of tile for each color and texture selected by Contracting Officer, min. 12 in. sq. sample mounted on plywood or hardboard backing, fully-grouted.
   2. Full-size units of each type of trim and accessory for each color required.

1.04 QUALITY ASSURANCE

A. Single-Source Responsibility:
1. Tile: Obtain each color, grade, finish, type, composition, and variety of tile from single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of work.
2. Setting and Grouting Materials: Obtain ingredients of uniform-quality from one manufacturer for each cementitious and admixture component and from one source or producer for each aggregate.

B. Qualifications:
1. Installer: Engage experienced installer who has successfully completed tile installations similar in material, design, and extent to that indicated for Project.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery:
1. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use.
2. Comply with requirements of ANSI A137.1 for labeling sealed tile packages.
3. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

B. Handling:
1. Handle tile with temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units.
2. If, despite these precautions, coating does contact bonding surfaces of tiles, remove coating from bonding surfaces before setting tile.

1.06 PROJECT CONDITIONS

A. Environmental Requirements:
1. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
2. Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.

3. When using tile setting and grouting materials with strong odors or noxious fumes, comply with manufacturer's recommendations for venting and controlling spread of odors or fumes.
4. Maintain temperatures at min. 50 deg. F(10 deg. C) in tiled areas during installation and for seven days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Tile: American Olean Tile Co. Inc., Dal-Tile Corp., Mid-State Tile Co., Monarch Tile Manufacturing Inc., Summitville Tiles Inc., United States Ceramic Tile Co.

B. Tile Setting and Grouting Materials: American Olean Tile Co. Inc., Boiardi Products Co., C-Cure Corp., Custom Building Products, Dal-Tile Corp., Laticrete International Inc., Mapei Corp.

2.02 MATERIALS

A. General:
1. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with following requirements:
a. Provide selections made by Contracting Officer from manufacturer's full-range of standard colors, textures, and patterns for products of type indicated.
b. Provide tile trim and accessories that match color and finish of adjoining flat tile.
c. Factory-Blending: For tile exhibiting color variations within ranges selected during sample submittals, blend tile in factory and package accordingly so that tile units taken from one package show same range in colors as those taken from other packages and match approved samples.

B. Tile Products:
   1. Porcelain Ceramic Tile:
      a. Type: Factory-mounted flat tile.
      b. Composition: Porcelain (color throughout tile).
      c. Size: 12 in. x 12 in.
      d. Thickness: 1/4 in.
      e. Finish: Cross sheen, ADA-compliant for slip-resistance without embedded aggregate in face.
      f. Face: Plain with cushion edges.
      g. Mounting: Factory edge-mounted.
   2. Glazed Tile:
      a. Type: Flat tile, nonvitreous.
      b. Size: 6 in. x 6 in.
      c. Thickness: 5/16 in.
      d. Face: Plain with modified square edge or cushion edge.
      e. Finish: Gloss.
      f. Mounting: Factory back-mounted.
   3. Quarry Tile:
      a. Type: Square-edged flat tile with static coefficient of friction per ASTM C1028, min. 0.6 for level surfaces.
      b. Wearing Surface: Abrasive aggregate embedded in surface.
      c. Size: 6 in. x 6 in.
      d. Thickness: 3/8 in.
      e. Finish: Unglazed, ADA-compliant for slip-resistance without embedded aggregate in face.
      f. Face: Plain.

C. Tile Trim Units:
   1. General:
      a. Provide tile trim to match characteristics of adjoining flat tile.
      b. Size: Coordinate with sizes and coursing of adjoining flat tile.
   2. Shapes - Thinset Mortar Installations:
      a. Base: Straight.
      b. Wainscot Cap: Surface bullnose.
      c. External Corners: Surface bullnose.

D. Setting Materials:
   1. Latex-Portland Cement Mortar: ANSI A118.4.
      a. Prepackaged dry mortar mix composed of portland cement, graded aggregate, and dry polymer additive in form of reemulsified powder.
      b. Latex Additive (Water Emulsion): Serving as replacement for part or all of gauging water,

combined at site with prepackaged dry mortar mix supplied or specified by latex additive manufacturer.

2. Organic Adhesive: ANSI A136.1, Type I.

E. Grouting Materials:
1. Latex-Portland Cement Grout: ANSI A118.6, color as indicated.
a. Prepackaged dry grout mix composed of portland cement, graded aggregate, and dry polymer additive in form of reemulsified powder.
b. Latex Additive (Water Emulsion): Serving as replacement for part or all of gauging water, combined at site with prepackaged dry mortar mix supplied or specified by latex additive manufacturer.

PART 3 EXECUTION

3.01 INSTALLATION

A. Standards:
1. ANSI Tile Installation Standard: Comply with parts of ANSI 108 Series of tile installation standards for installation of ceramic tile that apply to type of setting and grout materials and methods indicated.
2. TCA Installation Guidelines: Comply with TCA Handbook for Ceramic Tile Installation.

B. General Requirements:
1. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions.
2. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
3. Cutting and Fitting:
a. Form intersections and returns accurately.
b. Perform cutting and drilling of tile without marring visible surfaces.
c. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints.
d. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

4. Joint Pattern:
   a. Lay tile in grid pattern shown.
   b. Align joints when adjoining tiles on floor, base, walls, and trim are same size.
   c. Lay out tile work and center tile fields in both directions in each space or on each wall area.
   d. Adjust to minimize tile cutting, yet maintain pattern.
   e. Provide uniform joint widths.
   f. For tile mounted in sheets, make joints between sheets same width as joints within tile sheet.
   g. Lay out tile wainscots to next full tile beyond dimensions indicated.

C. Floor Installation Methods - Interior: Comply with referenced TCA Methods.
   1. Concrete Subfloor: TCA F113, latex-portland cement bond coat, tile, latex-portland cement grout; thinset.

D. Wall Installation Methods: Comply with referenced TCA Methods.
   1. Solid Backing: TCA W223, organic adhesive, tile, latex-portland cement grout.

3.02 CLEANING AND PROTECTION

A. Cleaning:
   1. On completion of placement and grouting, clean all tile surfaces free of foreign matter.
   2. Remove latex-portland cement grout residue from tile as soon as possible.
   3. Unglazed Tile:
      a. Clean with acid solutions only when permitted by tile and grout manufacturer's printed instructions, min. 14 days after installation.
      b. Protect metal surfaces, cast iron and vitreous plumbing fixtures, and similar surfaces from effects of acid cleaning.
      c. Flush surface with clean water before and after cleaning.
   4. Temporary Protective Coatings:
      a. Remove temporary protective coating using methods acceptable to manufacturer.
      b. Trap and remove coating to prevent it from clogging drains.

5. Leave finished installation clean and free of cracked, chipped, broken, unbonded, or defective tile work.

B. Protection:
1. When recommended by tile manufacturer, apply protective coat of neutral protective cleaner to completed tile walls and floors.
2. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining damage or wear.
3. Prohibit foot and wheel traffic on tiled floors for min. 7 days after grouting is completed.
4. Before final inspection, remove protective coverings and rinse with neutral cleaner.

END OF SECTION

SECTION 09511

ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: Work of this Section consists of installing all materials furnished under this Section, including all equipment, labor, services, and incidental items required to complete work as shown on Drawings and specified in this Section.
   1. General-application square-edge acoustical panel ceiling with exposed wide-face tee-suspension system.
   2. General-application decorative-edge acoustical panel ceiling with exposed narrow-face tee-suspension system.
   3. Special-performance ceramic and mineral fiber composite moisture-resistant square-edge acoustical panel ceiling with exposed wide-face suspension system.

B. Related Section:
   1. Division 15, Mechanical; for coordinating ceiling-mounted items.
   2. Division 16, Electrical; for coordinating ceiling-mounted items.

1.03 SUBMITTALS

A. Product Data: Submit for each type of product specified.

B. Samples for Verification Purposes:
   1. Submit each type of exposed finish required, prepared on samples of size indicated below and of same thickness and material indicated for final unit of work.
   2. Where finishes involve normal color and texture variations, include sample sets showing full-range of variations expected.

3. 6 in. sq. samples of each acoustical panel type, pattern, and color.
4. Full-size samples of each panel type, pattern, and color.
5. Set of 12 in. long samples of exposed suspension system members, including moldings, for each color and system type required.

1.04 QUALITY ASSURANCE

A. Qualifications:
1. Installer: Engage experienced installer who has completed acoustical ceilings similar in material, design, and extent to those indicated for Project.

B. Single-Source Responsibility:
1. Ceiling Units: Obtain each type of acoustical ceiling unit from single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of work.
2. Suspension System: Obtain each type of suspension system from single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of work.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver acoustical ceiling units to Project site in original, unopened packages and store them in fully-enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

1.06 PROJECT CONDITIONS

A. Space Enclosure: Do not install interior acoustical ceilings until space is enclosed and weatherproof, wet

work in space is completed and nominally dry, work above ceilings complete, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

B. Coordination of Work: Coordinate layout and installation of acoustical ceiling units and suspension system components with other construction penetrating ceilings or supported by them, including light fixtures, HVAC equipment, fire-suppression system components, and partition system.

PART 2 PRODUCTS

2.01 MATERIALS

A. Acoustical Panels:
1. General:
a. Provide manufacturer's standard units of configuration indicated complying with ASTM E1264 classifications as designated by reference to types, pattern, acoustical ratings, and light reflectance, unless otherwise indicated.
b. Mounting Method - Measuring NRC: Type E-400 (plenum mounting in which face of test specimen is 15-3/4 in. away from test surface) per ASTM E795.
2. Color and Patterns:
a. Provide products to match appearance characteristics indicated under each product type.
b. For acoustical ceiling units whose appearance characteristics are indicated by reference to ASTM E1264 designations for pattern and not by limiting to naming of one or more products or manufacturers, provide Contracting Officer's selection from each named manufacturer's full-range of standard products of type, color, pattern, and light reflectance indicated.
3. Acoustical Panels:
a. Type: Wet-formed mineral fiber.
b. Pattern: ASTM E1264, Type III, Form 2, Pattern FK.
c. Color: White.
d. Edge Detail: Angled tegular.
e. Size: 24 in. x 48 in. x 3/4 in.
f. Product: Armstrong World Industries Model Designer Second Look II #2754.

B. Metal Suspension Systems - General Requirements:
   1. Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated complying with applicable ASTM C635 requirements.
   2. Finishes and Colors: Provide manufacturer's standard factory-applied finish for type of system indicated.
   3. Attachment Devices: Size for 5 times design load indicated in ASTM C635, Table 1, Direct Hung, unless otherwise indicated.
   4. Wire for Hangers, Braces, and Ties:
      a. ASTM A641, Class 1 zinc coating, soft temper.
      b. Size: Select wire diameter so stress at 3 times hanger design load (ASTM C635, Table 1, Direct-Hung), will be less than yield stress of wire, min. 12 ga.
   5. Edge Moldings and Trim: Metal of types and profiles indicated or, if not indicated, manufacturer's standard molding for edges and penetrations fitting type of edge detail and suspension system indicated.
      a. Lay-In Panels with Reveal-Edge Details: Provide stepped edge molding forming reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
   6. Wide-Face Single-Web Steel Suspension System:
      a. Main and cross-runners roll-formed from prepainted or electrolytic zinc-coated cold-rolled steel sheet, with prepainted 15/16 in. wide flanges.
      b. Structural Classification: Intermediate-duty system.
      c. Finish: Painted, white.
      d. Product: Armstrong World Industries Model Prelude Exposed Grid.

PART 3 EXECUTION

3.01 PREPARATION

A. Layout:
   1. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling.
   2. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans.

3.02 INSTALLATION

A. General: Install acoustical ceiling systems to comply with installation standard referenced below, per manufacturer's instructions and CISCA Ceiling Systems Handbook.
   1. Standard for Ceiling Suspension System Installations: Comply with ASTM C636.
   2. Standards for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E580.

B. Ceiling hangers: Suspend from building structural members and as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum not part of supporting structural or ceiling suspension system.
   2. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
   3. Where width of ducts and other construction within ceiling plenum produces hanger spacings interfering with locations of hanger at spacings required to support suspension system members, install supplemental suspension members and hangers (trapezes or equivalent devices).
   4. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by reference standards.
   5. Wire Hangers:
      a. Secure to ceiling suspension members and to supports above with min. 3 tight turns.
      b. Connect hangers either directly to structures or to inserts, eye screws, or other devices that are secure, appropriate for substrate, and will not deteriorate or fail due to age, corrosion, or elevated temperatures.
   6. Secure bracing wire to ceiling suspension members and to supports with min. 4 tight turns, fastening bracing wires to concrete with cast-in-place or postinstalled anchors.
   7. Do not attach hangers to steel deck tabs.
   8. Do not attach hangers to steel roof deck; attach hangers to structural members.
   9. Space hangers max. 48 in. o.c. along each member supported directly from hangers, unless otherwise shown, and provide hangers max. 8 in. from ends of each member.

C. Edge Moldings and Trim:
   1. Install type indicated at perimeter of acoustical ceiling area and where necessary to conceal ends of acoustical units.
   2. Screw-attach moldings to substrate at intervals, max. 16 in. o.c. and max. 3 in. from ends, leveling with ceiling suspension system to tolerance of 1/8 in. in 12 ft.-0 in.
   3. Miter corners accurately and connect securely.

D. Suspension System Runners:
   1. Install square and securely interlocked with one another.
   2. Remove and replace dented, bent, or kinked members.

E. Panels:
   1. Install acoustical panels with undamaged edges and fitted accurately into suspension system runners and edge moldings.
   2. Where panels have factory-formed decorative edges, field-cut panels to match factory-formed decorative edges and repaint field-cut edges to match panel finish.
   3. Scribe and cut panels to fit accurately at borders and at penetrations.

3.03 CLEANING

A. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members.

B. Comply with manufacturer's instructions for cleaning and touchup of minor finish damage.

C. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09650

RESILIENT FLOORING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes: Work of this Section consists of installing all materials furnished under this Section, including all equipment, labor, services, and incidental items required to complete work as shown on Drawings and specified in this Section.
   1. Vinyl composition tile flooring.
   2. Wall bases.
   3. Rubber stair accessories.
   4. Setting materials.
   5. Accessories.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of resilient flooring and accessory.

B. Samples for Verification Purposes:
   1. Submit following samples of each type, color, and pattern of resilient flooring required, showing full range of color and pattern variations.
      a. Full size tile samples.
      b. 2-1/2 in. long samples of resilient flooring accessories.
      c. Other materials as requested.

C. Maintenance Instructions: Submit 2 copies of manufacturer's recommended maintenance practices for each type of resilient flooring and accessory required.

1.04 PROJECT/SITE CONDITIONS

A. Environmental Requirements:
   1. Maintain min. 65 deg. F(18 deg. C) in spaces to receive resilient flooring min. 48 hours before

installation, during installation, and min. 48 hours after installation.
2. Store resilient flooring materials in spaces where they will be installed for min. 48 hours before beginning installation.
3. Subsequently, maintain min. 55 deg. F(13 deg. C) in areas where work is completed.

B. Coordination:
1. Install resilient flooring and accessories after other finishing operations, including painting, have been completed.
2. Do not install resilient flooring over concrete slabs until latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by resilient flooring manufacturer's recommended bond and moisture test.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Vinyl Composition Tile: Armstrong World Industries Inc., Azrock Floor Products, Kentile Floors Inc., Tarkett Inc.

B. Vinyl Wall Base: Armstrong World Industries Inc., Azrock Floor Products Division, Flexco Division, Johnson Rubber Co. Inc., Kentile Floors Inc.

C. Rubber Treads, Risers, and Skirtings: Flexco Division, Jason Industrial Inc., Johnson Rubber Co., R.C. Musson Rubber Co. Inc., Nora Flooring Division, R.C.A. Rubber Co., Roppe Rubber Corp.

2.02 MATERIALS

A. General: Provide color and patterns as indicated, or if not otherwise indicated, as selected by Contracting Officer from manufacturer's standards.

B. Vinyl Composition Tile Flooring:
1. FS SS-T-312, Type IV; 12 in. sq. unless otherwise indicated.
2. Composition 1 - asbestos-free.
3. Gage: 1/8 in.

C. Base:
1. Rubber Wall Base: Provide rubber base complying with ASTM Type TS, Class 1, solid homogeneous color.
2. Height: 4 in.
3. Thickness: 1/8 in. gage.
4. Style: Straight base without cove for carpeted areas and cove base for hard surfaced areas.
5. Finish: Matte.

D. Resilient Stair Treads and Landings:
1. Provide treads where shown, consisting of single-piece units for width of stair treads, or equal-length units if tread width exceeds available manufactured lengths.
2. Provide rubber stair tread units complying with FS RR-T-650, type A, sanded backs, style as indicated.
3. Thickness: Min. 3/16 in. nominal and 1/4 in. at nosing.
4. Nose Design: Class 1 round nose.
5. Pattern: Low-profile raised dots.

E. Accessories:
1. Resilient Edge Strips: 1/8 in. thick, homogeneous rubber composition, tapered or bullnose edge, color to match flooring, or as selected by Contracting Officer from standard colors available; min. 1 in. wide.
2. Adhesives (Cements): Waterproof, stabilized-type as recommended by flooring manufacturer to suit material and substrate conditions.
3. Concrete Slab Primer: Nonstaining-type as recommended by flooring manufacturer.
4. Leveling and Patching Compounds: Latex-type as recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Subfloor:
1. Require Installer to inspect subfloor surfaces to determine they are satisfactory.
2. A satisfactory subfloor surface is defined as one that is smooth and free from cracks, holes, ridges, coatings preventing adhesive bond, and other defects impairing performance or appearance.
3. Perform bond and moisture tests on concrete subfloors to determine if surfaces are sufficiently

cured and dry and to ascertain presence of curing compounds.

4. Do not allow resilient flooring work to proceed until subfloor surfaces are satisfactory.

3.02 PREPARATION

A. Subfloor Surfaces:
1. Use leveling and patching compounds as recommended by resilient flooring manufacturer for filling small cracks, holes and depressions in subfloors.
2. Remove coatings from subfloor surfaces that would prevent adhesive bond, including curing compounds incompatible with resilient flooring adhesives, paint, oils, waxes and sealers.
3. Broom clean or vacuum surfaces to be covered, and inspect subfloor.
4. Apply concrete slab primer, if recommended by flooring manufacturer, before application of adhesive.
5. Apply in compliance with manufacturer's directions.

3.03 INSTALLATION

A. General:
1. Where movable partitions are shown, install resilient flooring before partitions are erected.
2. Install resilient flooring using method indicated in strict compliance with manufacturer's printed instructions.
3. Extend resilient flooring into toe spaces, door reveals, and into closets and similar openings.
4. Scribe, cut, and fit resilient flooring to permanent fixtures, built-in furniture and cabinets, pipes, outlets and permanent columns, walls and partitions.
5. Maintain reference markers, holes, or openings in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor, use chalk or other nonpermanent marking device.
6. Adhesion:
   a. Tightly cement resilient flooring to subbase without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections.
   b. Hand roll resilient flooring at perimeter of each covered area to assure adhesion.

B. Tile Floors:
   1. Lay tile from center marks established with principal walls, discounting minor offsets, so tile at opposite edges of room are of equal width.
   2. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeters.
   3. Lay tile square to room axis, unless otherwise shown.
   4. Match tiles for color and pattern by using tile from cartons in same sequence as manufactured and packaged if so numbered.
   5. Cut tile neatly around all fixtures.
   6. Broken, cracked, chipped, or deformed tiles are not acceptable.
   7. Lay tile in checkerboard fashion with grain reversed in adjacent tiles.
   8. Adhere tile flooring to substrates using full spread of adhesive applied in compliance with flooring manufacturer's directions.

C. Wall Base:
   1. Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required.
   2. Install base in lengths as long as practicable, fabricated from base materials with mitered or coped inside corners.
   3. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces.
   4. On masonry surfaces, or other similar irregular surfaces, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.

D. Edge Strips:
   1. Place resilient edge strips tightly butted to flooring and secure with adhesive.
   2. Install edging strips at edges of flooring which would otherwise be exposed.

E. Stair Accessories: Apply resilient accessories at stairs as indicated and in strict accordance with manufacturer's installation instructions.

3.04 CLEANING AND PROTECTION

A. Initial Cleaning: Perform following operations immediately on completion of resilient flooring:
   1. Sweep or vacuum floor thoroughly.
   2. Do not wash floor until time recommended by resilient flooring manufacturer has elapsed to allow resilient flooring to become well-sealed in adhesive.
   3. Damp mop floor being careful to remove black marks and excessive soil.
   4. Remove any excess adhesive or other surface blemishes, using appropriate cleaner recommended by resilient flooring manufacturers.

B. Protection:
   1. Protect flooring against damage during construction period to comply with resilient flooring manufacturer's directions.
   2. Apply protective floor polish to resilient flooring surfaces free from soil, excess adhesive or surface blemishes.
   3. Use commercially available metal cross-linked acrylic product acceptable to resilient flooring manufacturer.
   4. Protect resilient flooring against damage from rolling loads for initial period following installation by covering with plywood or hardboard.
   5. Use dollies to move stationary equipment or furnishings across floors.
   6. Cover resilient flooring with undyed, untreated building paper until inspection for Substantial Completion.

C. Final Cleaning:
   1. Clean resilient flooring min. 4 days before date scheduled for inspections intended to establish date of Substantial Completion in each area of project.
   2. Clean resilient flooring by method recommended by resilient flooring manufacturer.
   3. Strip protective floor polish, which was applied after completion of installation, before cleaning.
   4. Reapply floor polish after cleaning.

END OF SECTION